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Honeywell Process Solutions

ERX
Electronic Pressure Recorder

User Manual

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Honeywell

Revisions

1.02 Changed item 780 text to 790, missed labeled item Edited item 792 description	07/16/07
Change item 789 default to No	09/13/07
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Introduction

Mercury Instruments ERX is a microprocessor-based, stand-alone, self-powered data recorder that measures gas pressure(s), gas temperature, case temperature, and applied power supplies. Sampled measurements, logged Audit Trail data, alarms, and operating parameters are stored in non-volatile memory and may be retrieved directly with a laptop computer, Palm Pilot, Pocket PC, or remotely via modem. Pressure and Temperature, alarms, and other sampled parameters may be displayed on an optional internal or external Alpha-Numeric LCD (Liquid Crystal Display).

ERX Recorder is capable of sampling and recording up to three pressure transducers and ambient and gas temperatures. At the time of manufacturing, the ERX may be fabricated as a wall-mounted, pipe stand, or as a portable unit in an 800 series case, (three pressure default case) ERX Recorder (single pressure) or a Mini-AT (dual pressure) case.

Calibrating and serial accessing an ERX Recorder is accomplished by using Mercury Instruments' MasterLink32 version 3.50 or greater, Palm Suite, or Pocket PC software.

MasterLink32 is a Window multifunctional software program that's used to interface with an ERX Recorder, via a serial cable, modem, or Bluetooth device.
MasterLink32 provides the following functions:

- Instrument configuration
    - Date & Time
    - Alarm limits
    - Sample interval
    - Log interval
    - Audit Trail items (4 or 10 items)
    - Display list (up to 18 displayable items)
    - Units of measurement
- Pressure(s) and Temperature calibration
- Graph live pressure(s) or temperature
- Graph historical data retrieved for the ERX Recorder
- Audit Trail reports
- Serial Communications
- File management
- Instrument security
- See MasterLink32 'Help' for additional functions and features

Warranty

Mercury instruments, Inc. warrants all instruments covered by this manual to be free from defects in material and workmanship under normal use and service of this product. If returned to our factory, transportation charges prepaid, within 4 years of the original purchase shipment date, Mercury Instruments agrees to repair or replace any instrument, which its examination reveals to have been defective due to faulty workmanship or material. All obligations or liabilities on Mercury Instruments part is to repair or replace warranty instruments, and does not include any other type of claims or damages, including but not limited to consequential damages following the use of misuse of instruments sold by it. Mercury Instruments reserves the rights, at any time, to make changes, modifications or enhancements to this product without prior notification. This warranty is in lieu of all other warranties, express or implied. No agent is authorized to assume for Mercury Instruments any liability except as set forth above

Intrinsic Safety for Hazardous Locations

Underwriter's laboratories (UL) has listed the ERX Recorder as intrinsically safe for use in Class I, Division 1, Group D hazardous locations and Canadian Standards Associations (CSA) for use in Glass I, Division 1, Groups C & D hazardous locations. The ERX Recorder is recognized as intrinsically safe instrument when installed in accordance with UL control drawing 40-3332 or CSA control drawing 40-3332-A (see appendix).

Warning

Use only Mercury Instruments manufactured battery packs with part numbers as specified on the certification label or control drawing. Use of third-party battery packs voids product warranty, voids intrinsic safety certifications and may impair safety.

Modes of Operations

The ERX Recorder is in one of three operating modes. Each mode is well defined and suited to a particular purpose.
Operating Modes:

- **Sample**
- **Display list**
- **Serial**

Sample Mode

While in the sample mode, the instrument obtains, stores and compares pressure(s), temperature(s), and power supply voltage readings with alarm limit set points. If reading exceeds the alarm limit set points, the instrument outputs a single pulse out the alarm channel, display 'ALARM' or customer configured message on instruments equipped with an LCD, and if equipped with a modem, jumps into either a modem configured call-in sub-routine or an instrument call-in sub-routine.

Display List Mode

An LCD is required for display list mode operation. A push button is used to scroll through the pre-programmed items. Display list mode contains two lists (display list 1 & display list 2) and live readings (live enabled). Display list 1 can contain up to six items, display list 2 up to twelve items. Any of the instrument items maybe programmed in either list. Live-enable is determined by the instrument installed hardware, number of pressure transducers and whether equipped with a temperature probe. While in display mode operation, no changes are possible that will affect the configuration of the ERX Recorder; it will only display the pre-selected items.

Default Display Items and Live Enable

Instrument Configuration							
Item Code	P	PP	PPP	PT	PPT	PPPT	T
Display List 1 Items 1-6							
530	580	580	580	580	580	580	580
531	582	582	582	582	582	582	582
532	583	583	583	583	583	583	583
533	503	503	503	503	503	503	503
534	521	521	521	521	521	521	521
535	255	255	255	255	255	255	255
Live Display Enable							
536	P	PP	PPP	PT	PPT	PPPT	T
Display List 2 Items 1-12							
537	631	631	631	631	631	631	635

538	637	637	638	637	638	638	645
539	638	638	632	638	632	632	646
540	632	632	640	632	640	640	636
541	639	640	633	639	633	633	647
542	640	670	642	640	642	642	648
543	651	633	634	635	634	634	657
544	650	641	644	645	644	644	656
545	649	642	426	646	635	426	655
546	255	634	428	636	646	428	255
547	255	644	429	647	636	429	255
548	255	673	431	648	648	431	255

Display List 2 Items 1-12 P3 with Voltage Monitor							
537	255	255	255	255	255	255	255
538	255	255	255	255	255	255	255
539	255	255	255	255	255	255	255
540	255	255	255	255	255	255	255
541	255	255	255	255	255	255	255
542	255	255	255	255	255	255	255
543	255	255	255	255	255	255	255
544	255	255	255	255	255	255	255
545	255	255	255	255	255	255	255
546	255	255	255	255	255	255	255
547	255	255	255	255	255	255	255
548	255	255	255	255	255	255	255

Serial Access Mode

Serial access requires a serial cable, modem, or a Bluetooth device along with MasterLink32, Palm Pilot, or Pocket PC software. In addition, the instrument must be equipped with the same type of serial hardware that is accessing the instrument. While in this the mode the instrument may be configured, calibrated, or data can be retrieved from the instrument. Serial accesses consist of two levels, level one and level two.

Level 1

Level 1 software access is considered a lower level access to the instrument and software functions and is gained through the use of a laptop computer, Palm Pilot, or Pocket PC and appropriate serial hardware connected to the instrument's serial port. The user must enter a five-digit code access code (default 11111) to enter level one. Level one is limited in its ability to change or configure the instruments parameters and its functionality is control and configurable by Level 2 access.

Level 2

Level 2 software is the highest available level access and has access to all instrument and software functions and is gained through the use of a laptop computer, Palm Pilot, or Pocket PC and appropriate serial hardware connected to the instrument's serial port. The user must enter a five-digit code access code (default 22222) to enter level two.

Instrument Access

In addition, an instrument access code is necessary to maintain the instrument security and must be entered or preprogrammed in appropriate software site list at the time of either successful level one or level two serial links. Instrument default access code: 33333

How the ERX Recorder Works

The ERX Recorder utilizes a dedicated microprocessor in conjunction with precision sensors to measure gas pressure(s) and temperature(s) and records the measured values in memory. The electronic circuits are powered by a battery pack located inside of recorder case or by an external power source. The applied power regulated to voltages required by the connected circuits. While in the sample mode, most of the electronic circuitry is in an un-powered state (sleep mode) to conserve battery power. When an internal timer has reached the selected sample interval time, the electronics are energized and a sample measurement cycle begins.

When the recorder wakes-up and enters the sample measurement mode, the programmable firmware instructs the microprocessor to obtain analog measurements. The analog signals (pressure(s), temperature(s) and power) are multiplexed through the A/D converter and routed to the microprocessor. The microprocessor converts and stores the digitized analog signals to an equivalent numeric value, scaled to the selected engineering units. P1 pressure is stored in item 500; P2 pressure is stored in item 501; P3 pressure is stored in item 420; Gas temperature is stored in item 502; Case temperature is stored in item 503: and power is stored in item 521.

Once the all the measurements are obtained, the microprocessor compares the measured values to the parameter limits already in memory, i.e., high and low limits of pressure(s), temperature, power, etc; if any of the measured parameters are out-of-range, the firmware instructs the microprocessor to jump into an alarm subroutine. The alarm subroutine activates the appropriate alarm code item(s), turns on the alarm indicator, transmits an alarm pulse out the alarm channel and if equipped, activates a call-in, via a Messenger modem, CDMA…etc.

If during a sample measurement cycle wake-up the power supply voltage falls below the low limit set points, the microprocessor activates the alarm indicator, transmits an alarm pulse out the alarm channel, and, if equipped, activates a modem call-in.

After the microprocessor has completed the sample measurement cycle wake-up, the microprocessor will update memory, display the new samples data to the LCD, and return to the ‘sleep mode’ to conserve energy.

Other than time, the ERX Recorder will also wake-up due to either a serial link or push button activation. A wake-up caused by a serial communication link allows the recorder to communicate with serial devices connected to J5 or through a COMS I/O port. A push button activation access will cause the microprocessor to initiate the display list mode, as described on page XXXXX. In all cases, the microprocessor will initiate a sample measurement cycle as described earlier and continue to energize most circuits while the recorder is performing the user-requested tasks.

Pressure System

(1 to 5000 PSI)

The pressure-sensing system incorporates one, two or three precision strain gauge transducer. The transducers are housed in the ERX Recorder case and exit the case via 1/1” NPT female connector.

Precision pressure transducers are characterized to 32 numeric points at the factory to determine offset, linearity, repeatability, and hysteresis. The 32 points of characterization are unique to each transducer and referred to as 'Transducer Coefficients'. When replacing a transducer for any reason, the coefficients must be reloaded with the proper coefficients for the replacement transducer.

Temperature System

-40 to 150 (-40 to 65C)

The temperature system consists of a highly stable solid-state transducer connected to the ERX main circuit board through a 6-foot Teflon cable. The stainless steel probe is ¼" in diameter and six inches in length; however, longer or shorter probe lengths are available options as well as an armor cable. A ½" NPT nylon slip-along fitting is also provided for securing the temperature probe within the thermo well. The temperature probe assembly is universally interchangeable between ERX Recorders and electronic volume correctors.

Sample Interval

In the ERX Recorder sample-measurement mode applies power to the electronic circuit so the pressure(s), temperature(s), and power voltage measurements may be obtained. After obtaining new measurements, the item values and LCD are updated, and then compared to alarm limits, if the values exceed the alarm limit, the instrument will jump to alarm sub-routine. After completion of these tasks, the circuitry will return to the sleep mode of operation.
Sample rates: 1, 5, 10, 30, and 60 seconds, default is 10 seconds
Note: the faster the sample rate, the quicker battery powered instruments power is depleted.

Sample Interval	Battery Life
1 second	1 year
10 seconds	3 years
60 seconds	4 years

Log Interval

The log interval is a user-selectable item, its value determines how often Audit Trail report items are stored into the instrument's memory. The choices are 1, 5, 10, 15, 30, 60, or 24 hours, 60 minutes as the default. At the selected time interval, the recorder will automatically enter a sample measurement wake-up cycle and store the user-defined Audit Trail report items into the instrument's memory. The time-stamped record placed in memory will be identified with the log trigger "Time."

Hourly and daily time triggers will always occur at the top of the hour, at 00: 00: 00 zero minutes and seconds. For log triggers less than 60 minutes, time triggers will occur at 1, 5, 10, 15, or 30 minutes with zero seconds. Log triggers other than time will appear randomly and are placed in memory at the exact time the incident occurred.

Audit Trail

The ERX Recorder is capable of storing either 4 or 10 items in its Audit Trail. Any of the recorder items may be placed in the Audit Trail. Default: 10 Audit Trail Items

Interval	**10 items**	**4 items**
1 minute	3 days	6 days
5 minutes	17 "	30 "
10 minutes	34 "	60 "
15 minutes	50 "	110 "
30 minutes	90 "	150 "
60 minutes	180 "	365 "
24 hours	1000 "	2000 "

Default Audit Trail Report Items

Audit Trail Report Item 1-10							
Item Code	P	PP	PPP	PT	PPT	PPPT	T
589	500	500	500	651	651	651	657
590	651	651	651	650	650	650	656
591	650	650	650	649	649	649	655
592	649	649	649	670	670	654	678
593	672	501	501	657	654	653	689
594	681	654	654	656	653	652	677
595	671	653	653	655	652	421	687
596	679	652	652	676	655	655	521
597	503	503	421	503	673	673	255
598	521	521	521	521	521	521	255

Description of default Audit Trail items

Item	Description
421	P3 Average Pressure
500	P1 Pressure
501	P2 Pressure
503	Case Temperature
521	Battery Voltage
649	P1 Interval Average
650	P1 Interval High
651	P1 Interval Low
652	P2 Interval Average
653	P2 Interval High
654	P2 Interval Low
655	Temperature Interval Average
656	Temperature Interval High
657	Temperature Interval Low
670	P1 Current Day Average
671	P1 Current Day High
672	P1 Current Day Low
673	P2 Current Day Average
676	Temperature Current Day Average
677	Temperature Current Day High
678	Temperature Current Day Low
687	Temperature Current Day High
681	P1 Current Day Low Time
687	P1 Current Day High Time

Default Audit Trail with P3 Voltage Monitor

Audit Trail Report Item 1-10							
589	500	501	500	500	501	651	657
590	651	654	651	651	654	650	656
591	650	653	650	650	653	649	655
592	649	652	649	652	652	654	423
593	423	423	501	423	423	653	423
594	422	422	654	421	421	652	422
595	421	421	653	502	502	423	421
596	503	503	652	651	651	651	503
597	255	255	423	657	657	657	255
598	255	255	503	503	503	503	255

Description of default Audit Trail items

Item	Description	Item	Description
421	P3 Average Pressure	656	Temperature Interval High
422	P3 Interval High		
423	P3 Interval Low		
500	P1 Pressure	657	Temperature Interval Low
501	P2 Pressure	670	P1 Current Day Average
503	Case Temperature	671	P1 Current Day High
521	Battery Voltage	672	P1 Current Day Low
649	P1 Interval Average	673	P2 Current Day Average
650	P1 Interval High	676	Temperature Current Day Average
651	P1 Interval Low	677	Temperature Current Day High
652	P2 Interval Average	678	Temperature Current Day Low
653	P2 Interval High	687	Temperature Current Day High
654	P2 Interval Low	681	P1 Current Day Low Time
655	Temperature Interval Average	687	P1 Current Day High Time

Informational Display (LCD)

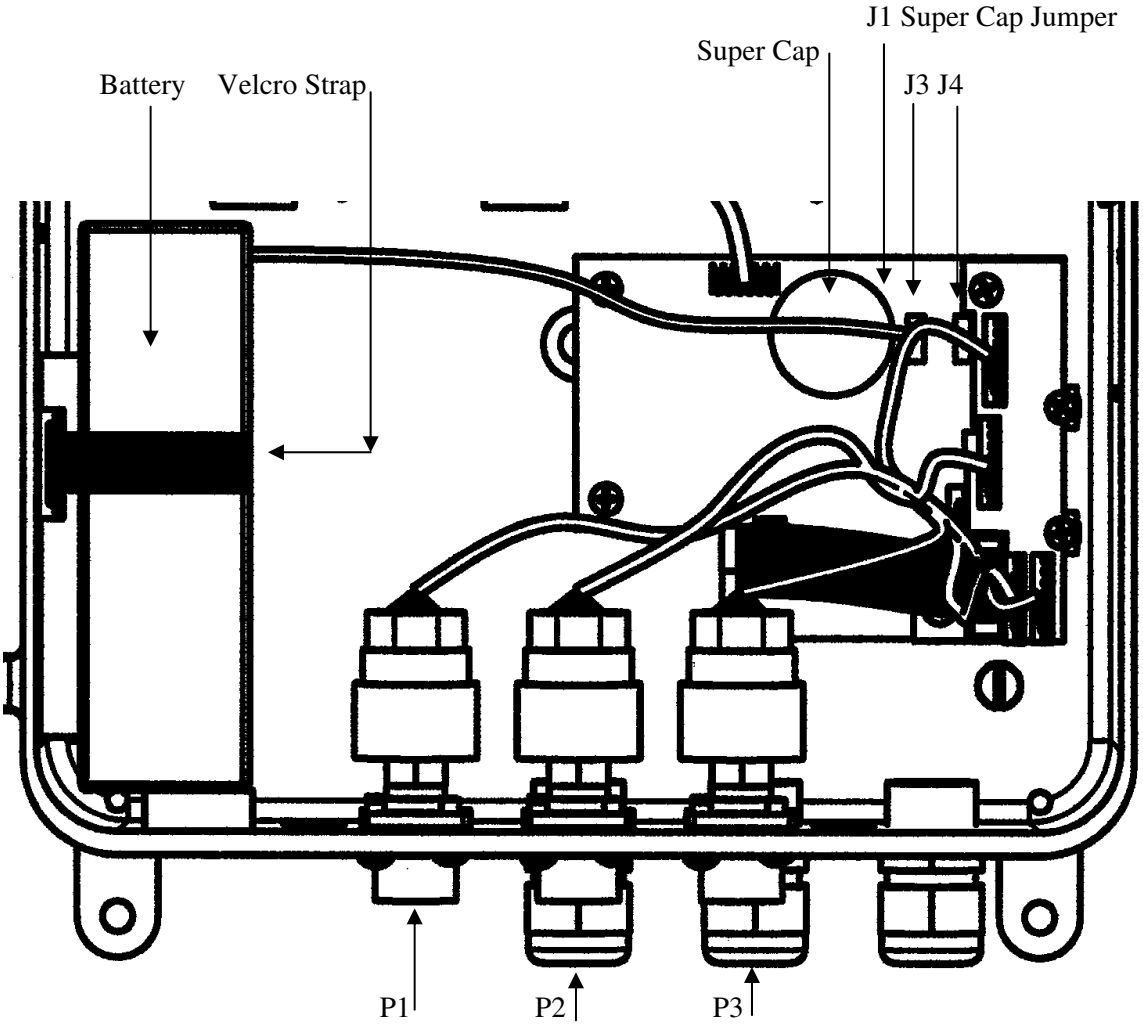
A single 8-digit alphanumeric display (LCD) is a standard feature of the ERX. The LCD may be mounted externally without a window cover, externally with a window cover, or internally. A LCD is required for viewing the display lists 1 & 2 data and live readings. Normally the instrument is in the sample measurement mode and the LCD displays the primary transducer (P1) last sampled pressure, default setup. The default item (P1) displayed while in the sample mode may be changed by changing the item entered in item 482, e.g. P2, P3, or etc. When activated by a push button function, the LCD will display any alarm conditions, display list 1 & 2, and live pressure(s) and temperature. If an instrument is in an alarm condition, the LCD will display 'ALARM' or a user-defined message, control by what is entered in item 483. The alarm message that's entered in item 483 can contain any alphanumeric character, but is limited to eight characters.

Installation and Operation of the ERX Recorder

Upon receiving the recorder, be sure that all items received are in good condition. Check the packing list to make sure the shipment is complete. Report to your Mercury Representative any damages and immediately file any shipping damage claims with the carrier who delivered the shipment.

Function Check

1. Open the case door, check for any loose parts, and verify that all connectors are properly seated.
2. • Ensure Super Cap jumper is installed onto both pins of J1
3. • Remove Velcro strap that secures the Alkaline Receptacle Battery Pack (default battery pack)
4. • Remove battery pack; open the cover by pulling on the Velcro tab underneath pack
5. • Install four alkaline D-cell batteries, observe polarity, secure cover and replace battery pack in the recorder, then secure with Velcro strap.
6. • Attach battery pack lead to either J3 or J4; J3 and J4 are parallel.



The LCD should display a pressure reading of close to ‘0.00. The recorder is now ready for functional checks.

> *Note: All of the function checks assume that the instrument has been configured with a default setup.

Use the MI Logo (push button) or an optionally installed push button to scroll through the display list(s) and stop at the live pressure reading. Without having made a pressure connection, the LCD will display a value very close to zero, typically, within +/- 0.4% of full scale.

Connect a pressure source to the external ¼” NPT pressure connector, apply a varying pressure (less than full scale) and observe an increase or decease in the LCD’s reading as the pressure varies. An automatic ten-minute time-out ensures that if a recorder left in a live reading, the recorder will return to the sample measurement mode to conserve battery power. Continue to scroll through the remaining display list items until the recorder has returned to the sample measurement mode.

Instrument Setup

The following items are critical in the recorder’s operation and proper configuration.

Instrument Configuration

Item 576 configures what the recorder will record, that is, pressure(s) and temperature data, if equipped, e.g. P, PP, PPP, PT, or PPPT.

Pressure

	Transducer Range	Xducer Range	Unit	Coefficients	Board Coefficients
Pressure (P1)	570	572	549	301~332	178~181
Pressure (P2)	571	573	550	341~372	441~444
Pressure (P3)	412	419	408	150~155	445~448
				605~630	
Temperature			551		

Site IDs

Site identification items 580 and 581, used to identify the recorder to the associated software. Items 580 and 581 Site IDs are preprogrammed using the recorder’s serial number, set by the factory prior to shipping, but may be changed to meet company’s requirement. Site IDs must remain unique, that is, no two recorders should have the same Site ID numbers.

Using MasterLink32 Software:

• Date and Time
Instrument→ Set Inst. Date/Time via computer, ensure date and time is correct in the computer before setting date and time via computer.

Or

Manually set time by entering the time in item 582
Manually set the date by entering the date in item 583

• Sample Interval
Item 586

• Log Interval
Item 585

• Start-of-Gas Day
Item 587

• Alarm Limits

	Low Limit	High Limit	Low/Low	High/High
Pressure (P1)	554	553	814	813
Pressure (P2)	556	555	818	817
Pressure (P3)	452	451	808	807
Temperature	564	563		
Battery	565			

2-Point Pressure Calibration (Defined)

A 2-Point Pressure Calibration requires that two different pressures be applied to the instrument's pressure transducer and be sampled by the data acquisition circuits. A low pressure value, usually 0.00 PSI, is applied to determine the Pressure Zero Calibration (offset). A higher pressure value is applied to determine the Pressure Span Calibration (gain). The default Calibration Parameters require that the Span Pressure exceeds the Zero Pressure by at least 50% of the transducer range, otherwise a "Points Too Close" error message is displayed.

To produce a linear pressure response for all rated pressures and temperatures, each transducer has been factory characterized for ambient temperature effects. The characterization process determines the proper compensation coefficients for each transducer. The 2-point calibration process uses the coefficients when calculating the pressure offset and pressure span values. Once these two points have been calculated and stored in the instrument's memory, all other applied pressures and temperature are automatically compensated by the coefficients.

2-Point Pressure Calibration (Gauge Transducers)

2-point pressure calibration (items required)

- ERX Recorder
- Pressure source and fittings (capable of providing pressures of at least 50% of the ERX pressure transducer range)
- Pressure Reference (accuracy to equal or exceed the accuracy of the ERX pressure system)
- Computer (IBM Compatible)
- MasterLink32 Software
- I/O cable, part number 40-1629 and a MPA, part number 40-2620 or through the use of I/O cable, part number 40-1629 only if the instrument is equipped with an external case connector and a third option is through the use of I/O cable 40-2696 that connects directly to J5 on the main circuit board.

2-point pressure calibration (procedure)

Make certain that the Pressure Compensation Coefficients listed are for the pressure transducer installed. Also verify that Item Code 087 is the desired pressure unit. Item Code 138 matches the transducer serial number label and item 112 is set for **Gauge** type transducer. Since the two-point calibration is mostly a software function, references to the appropriate sections in the MasterLink32 Link software are included.

1. Connect the pressure source and pressure reference to the ERX pressure connector.
2. Make a serial connect from the computer's serial port to the ERX serial port.
3. Start MasterLink32 software on the computer.
4. Enter the access code for Level 1 or Level 2 when requested. The default Level 1 Access Code is "11111", the default Level 2 Access Code is "22222".
5. If a communications link has not yet been established, the screen will display a box requesting the user to input the Instrument Access Code. Enter the access code when this box appears. The default code is "33333"

6. Select “Calibrate” from the main menu.
7. Select “Pressure Calibration” from the sub-menu.
8. With zero pressure applied to the ERX pressure transducer, perform the “Pressure Zero Calibration.” The pressure displayed in green on the computer’s screen is a live reading. This permits the user to determine if the pressure has stabilized so that a sample may be obtained. Click the AVERAGE PRESSURE NOW button when it becomes active (text changes from gray to black) to obtain a sample of the applied pressure.
9. When MasterLink32 displays “Average Pressure”, the value should be changed to match the pressure reference by clicking the CHANGE button when it becomes active. Enter the pressure value for the zero reference pressure (usually 0.00). The ERX will calculate the required difference offset, store this calculated value within the instrument before returning to a live pressure reading.
10. Compare the displayed pressure to the reference pressure. If the ERX pressure reading is not acceptable, click the AVERAGE PRESSURE NOW button again to obtain another pressure sample. The program will continue to loop back to the live pressure reading. Obtain as many pressure samples as necessary until an acceptable pressure reading is displayed.
11. If the ERX zero pressure reading is acceptable, click the SPAN button to change to the Span Calibration sequence.
12. The screen title should have changed to “Pressure Span Calibration.” At this point, the software is waiting to sample the applied pressure. Increase the pressure applied to the ERX to the span reference pressure. This must be greater than 50% of the transducer range.

    Example #1: If the zero reference pressure on a 100 PSI transducer equals 0.00 PSI, then the span reference pressure must be between 50.00 and 100.00 PSI.

    Example #2: If the zero reference pressure on a 600 PSI transducer equals 0.00 PSI, then the span reference pressure must be between 300.00 and 600.00 PSI.

13. The span calibration also displays a live pressure reading to allow the user to determine if the span reference pressure has stabilized. When the pressure has stabilized, click the AVERAGE PRESSURE NOW button when it becomes active to obtain a pressure sample.
14. If the average pressure reading is not equal to the span reference pressure, click the CHANGE button when it becomes active. Enter the pressure value for the span reference pressure. As the computer screen updates, the ERX will calculate the required span gain, store this calculated value within the instrument before returning to a live pressure reading. Obtain as many pressure samples as necessary until an acceptable span pressure reading is displayed.
15) Compare the average pressure reading to the span reference pressure. If the average pressure reading is acceptable, the pressure calibration process is complete. As a suggestion, recheck the pressure zero reading and any number of pressure points within the transducer range, or click DONE to exit the calibration sequence.

Two-Point Pressure Calibration (Absolute Transducers)

Two-point pressure calibration (items required)

- ERX
- Pressure Source and fittings (capable of providing pressures of at least 50% of the ERX pressure transducer range)
- Pressure Reference (accuracy to equal or exceed the accuracy of the ERX pressure system)
- Computer (IBM Compatible)
- I/O cable, part number 40-1629 and a MPA, part number 40-2620 or through the use of I/O cable, part number 40-1629 only if the instrument is equipped with an external case connector and a third option is through the use of I/O cable 40-2696 that connects directly to J5 on the main circuit board.
- Barometer

Two-point pressure calibration (procedure - absolute)

Make certain that the Pressure Compensation Coefficients loaded in the instrument are for the pressure transducer installed. Also verify that instrument is setup for the desired pressure unit. Since the two-point calibration is mostly a software function, references to the appropriate sections in the MasterLink32 software are included.

1. Connect the pressure source and pressure reference to the ERX pressure connector.
2. Make a serial connect from the computer's serial port to the ERX serial port.
3. Start MasterLink32 software on the computer.
4. Enter the access code for Level 1 or Level 2 when requested. The default Level 1 Access Code is "11111", the default Level 2 Access Code is "22222".
5. If a communications link has not yet been established, the screen will display a box requesting the user to input the Instrument Access Code. Enter the access code when this box appears. The default code is "33333".
6. Select "Calibrate" from the main menu.
7. Select "Pressure Calibration" from the sub-menu.
8. With zero pressure applied to the ERX pressure transducer, perform the "Pressure Zero Calibration." The pressure displayed in green on the computer's screen is a live reading. This permits the user to determine if the pressure has stabilized so that a sample may be obtained. Click the AVERAGE PRESSURE NOW button when it becomes active (text changes from gray to black) to obtain a sample of the applied pressure.
9. Obtain the current local atmospheric pressure reading using a barometer or by some other means. When MasterLink32 displays "Average Pressure", the value should be changed to match the current atmospheric pressure value by clicking the CHANGE button when it becomes active. Enter the current atmospheric pressure value, making sure the units are comparable, i.e., PSIA. The ERX will calculate the required difference offset, store this calculated value within the instrument before returning to a live absolute pressure reading.
10. Compare the displayed pressure to the reference pressure. If the ERX absolute pressure reading is not acceptable, click the AVERAGE PRESSURE NOW button again to obtain another pressure sample. The program will continue to loop back to the live pressure reading. Obtain as many pressure samples as necessary until an acceptable pressure reading is displayed.
11. If the ERX absolute pressure reading is acceptable, click the SPAN button to change to the Span Calibration sequence.
12. The screen title should have changed to "Pressure Span Calibration." At this point, the software is waiting to sample the applied pressure. Increase the pressure applied to the ERX Recorder to the span reference pressure that exceeds the zero reference pressure by at least 50% of the rated transducer range.

Example #1: If the zero reference pressure on a 100 PSIA transducer equals 14.73 PSIA, then the span reference pressure must be between 64.73 and 100.00 PSI.

Example #2: If the zero reference pressure on a 100 PSIA transducer equals 13.25 PSIA, then the span reference pressure must be between 63.25 and 100.00 PSI.

Example #3: If the zero reference pressure on a 600 PSIA transducer equals 14.73 PSIA, then the span reference pressure must be between 314.73 and 600.00 PSI.

13. The span calibration also displays a live pressure reading to allow the user to determine if the span reference pressure has stabilized. When the absolute pressure has stabilized, click the AVERAGE PRESSURE NOW button when it becomes active to obtain a pressure sample.

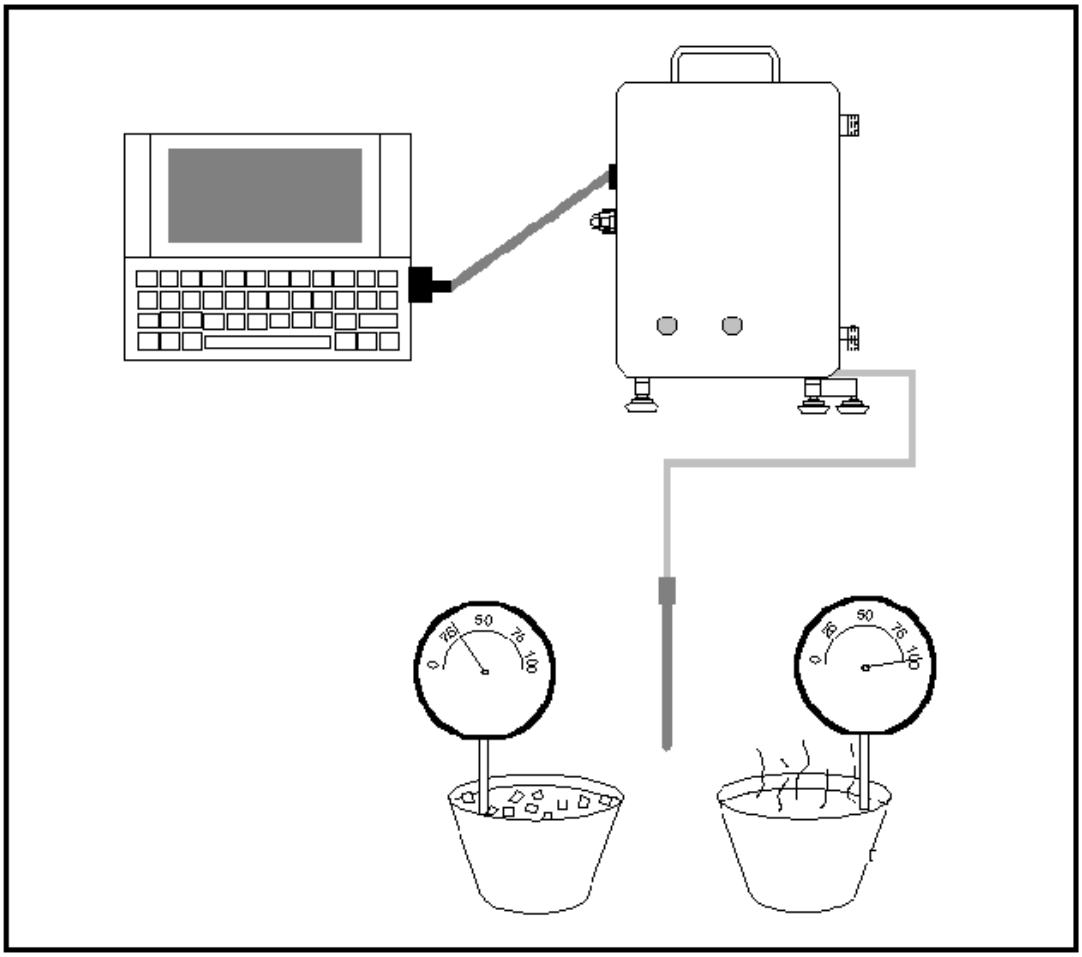
NOTE: The span reference pressure is equal to the sum of the dead weight tester pressure, and the atmospheric pressure obtained in step 9 above.

14. If the average pressure reading is not equal to the span reference pressure, click the CHANGE button when it becomes active. Enter the pressure value for the span reference pressure. As the computer screen updates, the ERX will calculate the required span gain, and store this calculated value within the instrument before returning to a live pressure reading. Obtain as many pressure samples as necessary until an acceptable span pressure reading is displayed.
15. Compare the average, absolute pressure reading to the span reference pressure. If the average pressure reading is equal to the sum of the applied pressure plus the atmospheric pressure, the pressure calibration process is complete. As a suggestion, recheck the pressure zero reading and any number of pressure points within the transducer range, or click DONE to exit the calibration sequence.

Two-Point Temperature Calibration

A Two-point Temperature Calibration requires that two different temperatures be applied to the instrument's temperature probe and be sampled by the data acquisition circuits. A low temperature source, usually a 32 degrees F ice bath is used to determine the Temperature Zero Calibration. A higher temperature source is used to determine the Temperature Span Calibration (gain). The default calibration parameters require the Span Temperature exceed the Zero Temperature by at least 15% of the instrument temperature range.

The temperature probe provides a nonlinear, but very predictable temperature response for all rated temperatures. The instrument's firmware chip contains the required information to produce a linear temperature response for any connected temperature probe. The Two-Point Calibration process uses the temperature offset and temperature span values to adjust for individual variations. Once these two points have been calculated and stored in memory, all other applied temperatures can be determined by a linear interpolation.



Alarm Pulses (Form-A)

The alarm output pulse is available as a Form-A output only. The alarm output pulse width is fixed at 50 mS and there is no need for pulse scaling. An alarm pulse output is a one-time occurrence, at the time any alarm becomes active. Subsequent alarm pulses will not occur until all previous alarms have been cleared.

Output Pulse Specifications

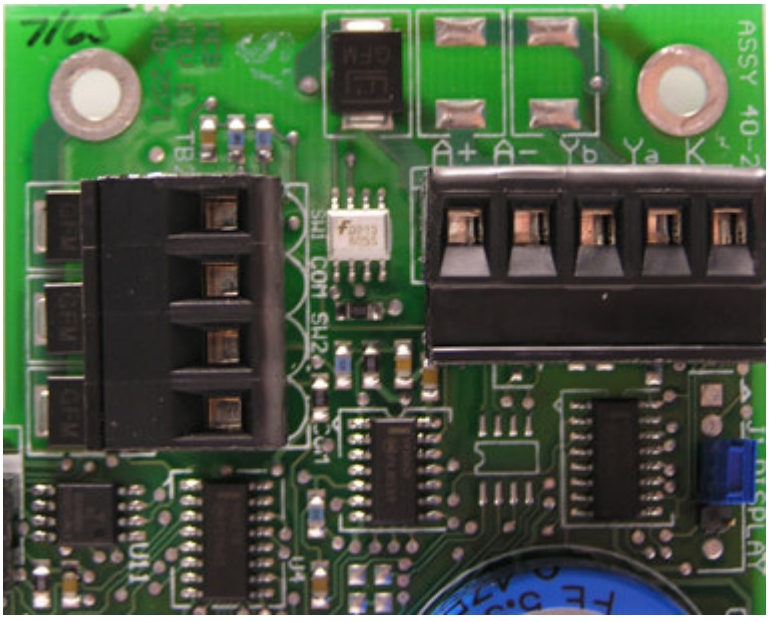
1. All outputs are isolated from ground and each other.

2. Outputs are rated for **DC only**, from 3.0 volts to 10.0 volts. Observe polarity.

3. The alarm output will sink up to 5 mA. Pulse duration is 50 mS minimum.

4. Form-A contact closures are between the A- and A+ terminals. The contact closures are held for 50 mS. Note: Observe polarity.

   Note: A- and A+ output channel is also used to power (on/off) an internal or external communication devices, i.e. cellular phones, modem, radio...etc.

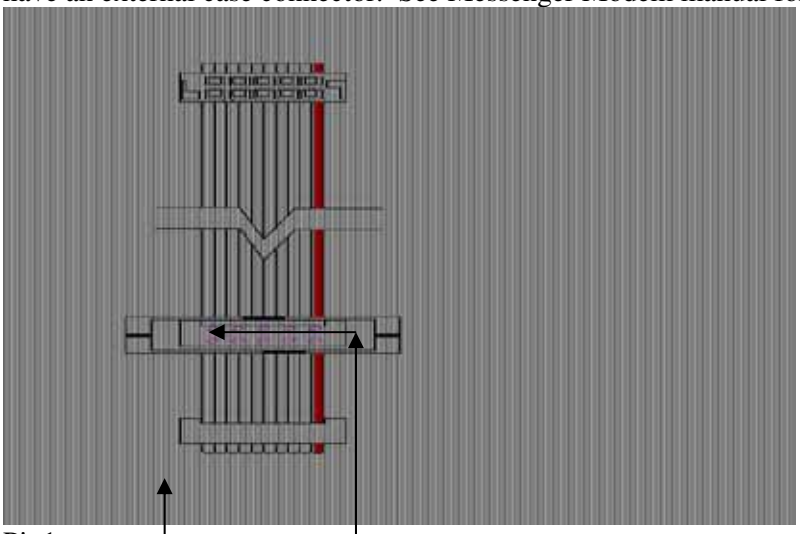


Communicating to the ERX Recorder with a Modem

The ERX Recorder has a single I/O serial port that is used for local serial connections and for modem connections. The I/O serial port baud rate is controlled by item 588, is set to "Auto baud" and automatically adjusts from the 38400, the starting baud rate to match the baud rate of connecting serial device. However, it is highly recommended when communicating with the recorder via a modem to adjust item 588 (serial baud) to match the baud rate of the connecting modem's RS-232 port. The serial port will support the following lines: TX, RX, and COM,

Internal Modem Communications

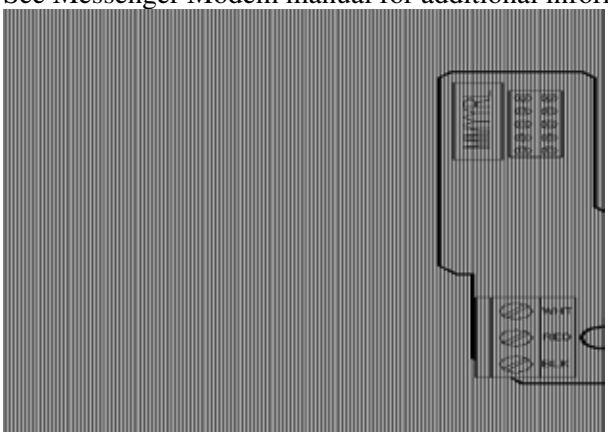
Mercury Instruments manufactures a low power modem designed to be installed within the case of the ERX Recorder, the Messenger Modem. The Messenger Modem can communicate with the ERX via a ribbon cable, which is used for internal Messenger Modem installations that do not have an external case connector. See Messenger Modem manual for additional information.



RS-232 to CMOS I/O port, use to connect serially to the recorder using an IBM compatible computer or PDA and a communication cable 40-2696-1 technician cable.

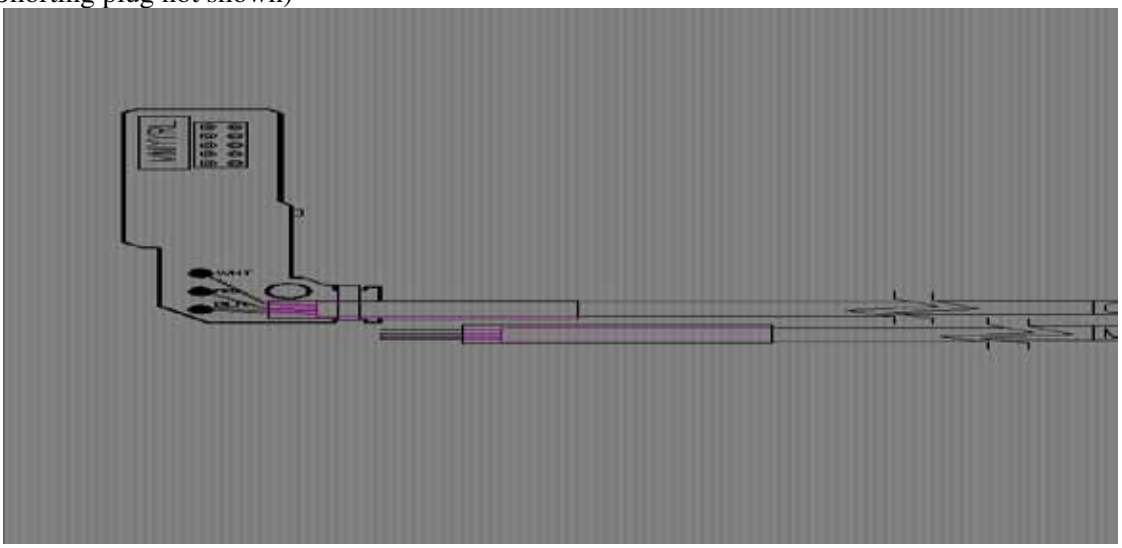
External Modem Communications without an External RS-232 Case Connector

Requires the use of an optional RS-232 to CMOS I/O Board, 40-2717-2:
See Messenger Modem manual for additional information.

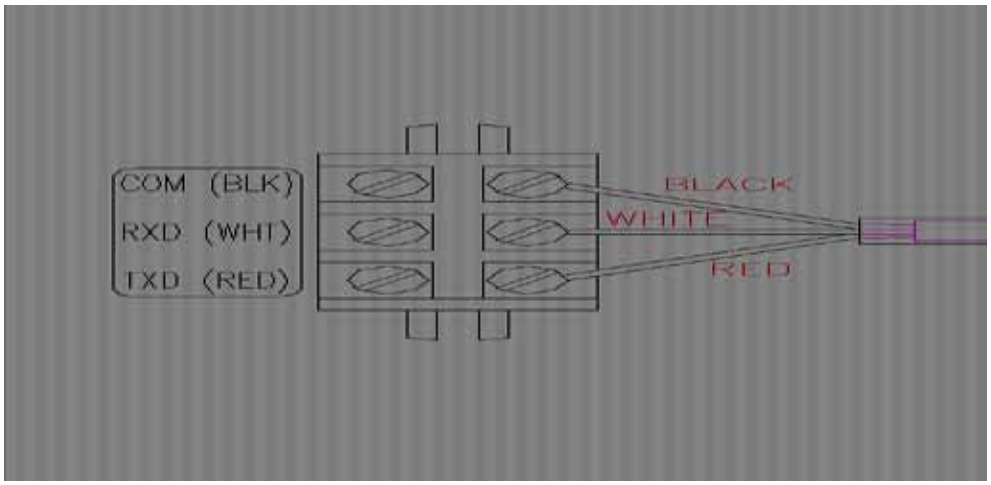


Internal or External Communications with a RS-232 Case Connector

Requires the use of an optional RS-232 to CMOS I/O Board with shorting plug, 40-2717-3:
(Shorting plug not shown)



External Modem Communications with a RS-232 CMOS I/O Board with shorting plug and stripped wires, 40-2717-8, same as 40-2717-3 but instead of three stripped wires it has a terminal block to facilitate external modem connection.



Automatic Call-In Feature

Alarm Call-In

Pulse Method

The ERX Recorder has the capability to initiate a modem-to-modem call. There are two circumstances where the ERX Recorder will initiate a call, Alarm Call-In and a Schedule Call-In.

The Alarm Call-In feature can be configured to call in two ways: 1is to use the alarm pulse output of the ERX Recorder to trigger the automatic call-in feature of the MI Modem. Once and an alarm condition has been detected by the recorder, the recorder will generate an alarm pulse, that will cause the MI Modem to jump into an alarm subroutine that has been pre-programmed in the MI Modem program.

To use this method, set the following items:

Item		Code	Set to
333	Call-In Trigger	1	Alarm Call-In
484	Alarm Channel Control	0	Alarm Pulse Output
789	Modem AT Enable	0	Call-In via Alarm Pulse

Note: The MI Modem must be configured properly for this method to work; see MI Modem installation guide for more information.

AT Commands Method

The AT command method is accomplished by sending Hayes AT-type commands out the serial I/O port to a generic-type modem, such as the Messenger Modem. This method has the ERX recorder controlling the Hayes compatible modem.

To use this method, set the following items:

Item		Code	Set to
333	Call-In Trigger	1	Alarm Call-In only
789	Modem AT Enable	1	Call-In via AT commands
780	Modem Init String	Initialization command of the Modem **Default:** ATE0Q0V0X4	
781	Modem Dial String	Command sent to indicate dialing **Default:** ATDT	
782	Modem Hang-up String	Command sent to modem for hang-up **Default:** ATH	
784	Alarm Call-In Phone#	Phone number to call due to an alarm	
786	Modem Retry Interval A	Time (minutes) between short-term retries **Default:** 5	
787	Modem Retry Interval B	Time (minutes) to wait before trying again if all short-term retries have failed **Default:** 1440	
788	Modem Retry Count A	Number of short-term retries **Default:** 3	

Scheduled Call-In Method

The Scheduled Call-In feature requires the ERX Recorder to issue AT commands to a generic modem or to a Messenger modem. This feature, designed to interface with third party software applications that can accept a scheduled call-in from a remote site.

To use this method, set the following items:

Item		Code	Set to
333	Call-In Trigger	2	Scheduled Call-In only
334	Scheduled Call-In Date	Date of call	
335	Scheduled Call-In Time	Time of call	
339	Scheduled Call-In Phone #	Phone number to call at schedule time	
789	Modem AT Enable	1	Call-In via AT commands
780	Modem Init String	Initialization command of the Modem **Default:** ATE0Q0V0X4	
781	Modem Dial String	Command sent to indicate dialing **Default:** ATDT	
784	Alarm Call-In Phone#	Phone number to call due to an alarm	
782	Modem Hang-up String	Command sent to modem for hang-up **Default:** ATH	
786	Modem Retry Interval A	Time (minutes) between short-term retries	

			Default: 5
787	Modem Retry Interval B	Time (minutes) to wait before trying again if all short-term retries have failed	
			Default: 1440
788	Modem Retry Count A	Number of short-term retries	

Note: Item 334 must be reset after a Scheduled Call-In; otherwise, the recorder will not call again.

Alarm and Scheduled Call-In

The ERX Recorder, if configured, can initialize a call-in due to an alarm and a scheduled-call-in. In this method, item 338 (Scheduled Call-In Occurred) may be used by the host system to determine whether the call-in was triggered by an alarm or due to a scheduled call-in. A scheduled call-in will have changed item 338 from '0' to '1' indicating that a scheduled call-in occurred and not an alarm. Item 338 must have its value reset to a value of '0' and item 334 must be reset for the next scheduled call-in date after a Scheduled Call-In; otherwise, the recorder will not call again.

To use this method, set the following items:

Item		Code	Set to
333	Call-In Trigger	3	Alarm & Scheduled Call-In
334	Scheduled Call-In Date	Date of call	
335	Scheduled Call-In Time	Time of call	
339	Scheduled Call-In Phone #	Phone number to call at schedule time	
789	Modem AT Enable	1	Call-In via AT commands
780	Modem Init String	Initialization command of the Modem	
			Default: ATE0Q0V0X4
781	Modem Dial String	Command sent to indicate dialing	
			Default: ATDT
784	Alarm Call-In Phone#	Phone number to call due to an alarm	
782	Modem Hang-up String	Command sent to modem for hang-up	
			Default: ATH
786	Modem Retry Interval A	Time (minutes) between short-term retries	
			Default: 5
787	Modem Retry Interval B	Time (minutes) to wait before trying again if all short-term retries have failed	
			Default: 1440
788	Modem Retry Count A	Number of short-term retries	

Modem Power Control--Call-out Window

Modem power control is used to conserve battery power by only applying power to a communication device within an operating window when communication is desired. Modem power control utilizes the alarm output channel of TB1; A- and A+ to control the power applied to a communication device, such as, a modem, CDPD, or radio, etc.

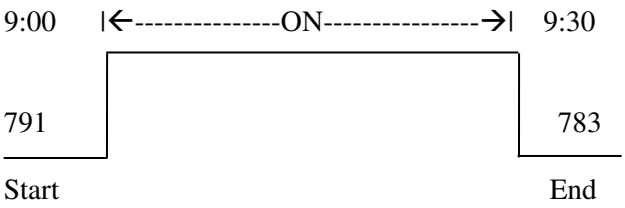
Item 484, Alarm-Channel-Control must be configured to **Modem Power** control instead of the default Alarm Pulse output. This action defeats Alarm Pulse output.

The period that the communications device is powered is controled by item 791 **Call-out Start Time** and item 783 **Call-out Stop Time** and further defined by item 792 **Call-out Repeat Interval** and item 793 **Call-out Keep Alive Time**.

If both items 792 or 793 is set to zero disables modem power control.

30-Minute Window Interval

To power a communication device for a thirty-minute period that starts at 9:00 AM and ends at 9:30 AM, configure item 791 to 09 00 00 and item 783 to 09 30 00 and items 792 & 793 to 30 minutes.



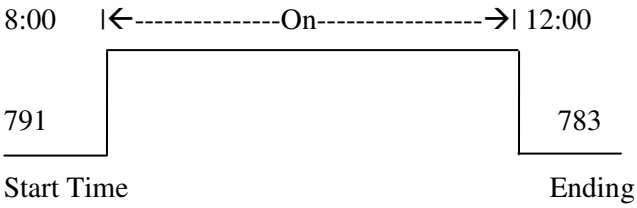
Item 792: 30 minutes
Item 793: 30 minutes

Setting the above items to the values shown will keep a communication device on for a period of 30 minutes.

Note: that extending the time that the recorder controls the power applied to the communication device will reduce the battery reserve. It is recommended, that if the Modem Power control interval is greater than 15 minutes per day, that the recorder has either, a dual battery pack, a Solar power supply, or an AC to DC power supply with battery backup.

4-Hour Window Interval

To power a communication device for a four hour interval that starts at 8 00 AM and ends at 12 00 PM, configure item 791 to 08 00 00 and item 783 to 12 00 00 and items 792 & 793 to 30 minutes.



Item 792: 30 minutes
Item 793: 30 minutes

Setting the above items to the values shown will keep a communication device powered for a interval of four hours. Take note that items 792 and 793 have the same value and having the same value will force the recorder to apply power to the communication device for the entire interval.

Note: that extending the time that the recorder controls the power applied to the communication device will reduce the battery reserve. It is recommended, that if the Modem Power control interval is greater than 15 minutes per day, that the recorder has either, a dual battery pack, a Solar power supply, or an AC to DC power supply with battery backup.

Multiple Windows- within the start and ending interval

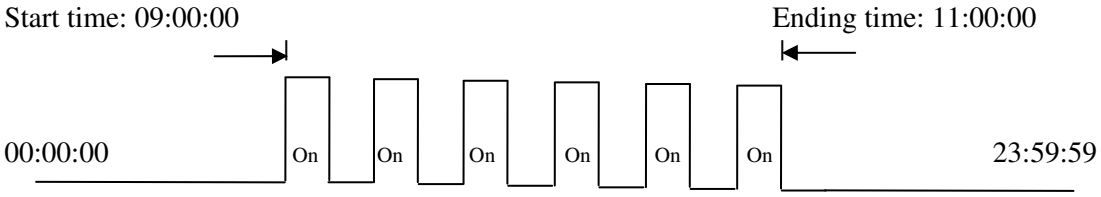
Configure the recorder the same as the 30-minute window and adjust items 791 and 783, as needed, and change items 792 and 793 to create the amount of time the communication device is powered within the interval.

Item 792 Call-out Repeat Interval
Item 793 Call-out Keep Alive Time

Example: 2-Hour interval with repeating 5 minute windows

Item 791 = 09 00 00
Item 783 = 11 00 00
Item 793 = 5 minutes
Item 792 = 20 minutes

Will power the communication device starting 9: 00 Am and ends at 11: AM
On 9:00~9:05
Off 9:05~9:20
On 9:20~9:25
Off 9:25~9:40
On 9:40~9:45
Off 9:45~10:00
On 10:00~10:05
Off 10:05~10:20
On 10:20~10:25
Off 10:25~10:40
On 10:40~10:45
Off 10:45~11:00
Window repeats the next-day



Note that the recorder is applying power to the communication device for a total of 30 minutes.

Note: that extending the time that the recorder controls the power applied to the communication device will reduce the battery reserve. It is recommended, that if the Modem Power control interval is greater than 15 minutes per day, that the recorder has either, a dual battery pack, a Solar power supply, or an AC to DC power supply with battery backup.

Digi-Span Fuel Switching Feature

An ERX connected to a Digi-Span module provides an automatic or manual fuel switching function when item 340 is enabled. This feature requires ERX's Pulser-A output to be connected to the Digi-Span's "Gas Override" terminal, the Pulser-B output connected to the "Oil Override" terminal, and the common terminal 'K' connected to the Digi-Span common. When item code 340 is configured for Automatic mode, a pre-selected temperature at the Digi-Span module determines which fuel is 'switched on'. Item 340 may also be configured for either a manual "Gas Override" or a manual "Oil Override", which results in a continuous ON at one of the pulse outputs channels.

Although not an original design consideration, there may be other applications that could make use of a continuous ON from either pulse output channel besides the Digi-Span module. Care must be taken to be certain that the connected device can be actuated with 5 mA of current, or less. Regardless of the connected device, enabling item 340 places a heavier burden on the battery, which will decrease battery life.

Firmware Upgrade

ERX Recorder firmware (instrument operating instructional program) is stored in flash memory. Adding new features, capabilities, and correction of firmware issues to the instrument is simply a matter of uploading a text file containing a newer version of firmware, via a MPA

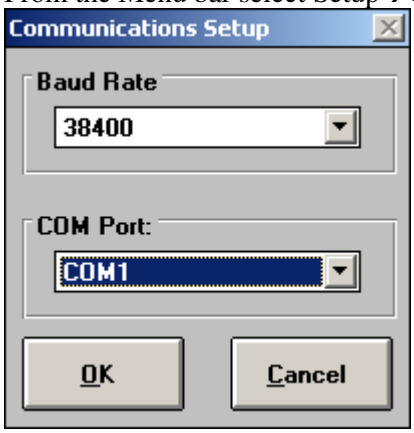
Flash Access Security is provided by the use of the Serial Port Adapter (MPA). To upgrade flash memory, use the free software application Firmware Upgrade Manager available through your Mercury representative or by contacting Mercury Instruments.

Important
Before performing a firmware upgrade procedure download an item file and Audit Trail data using MasterLink32 software only. All data and configuration information is lost and the recorder is in a firmware default configuration after upgrading the firmware.

NOTE: If the ERX has an optional pressure expansion board installed, discount the expansion board's ribbon cable from J2 of recorder's main circuit board prior to upgrading firmware

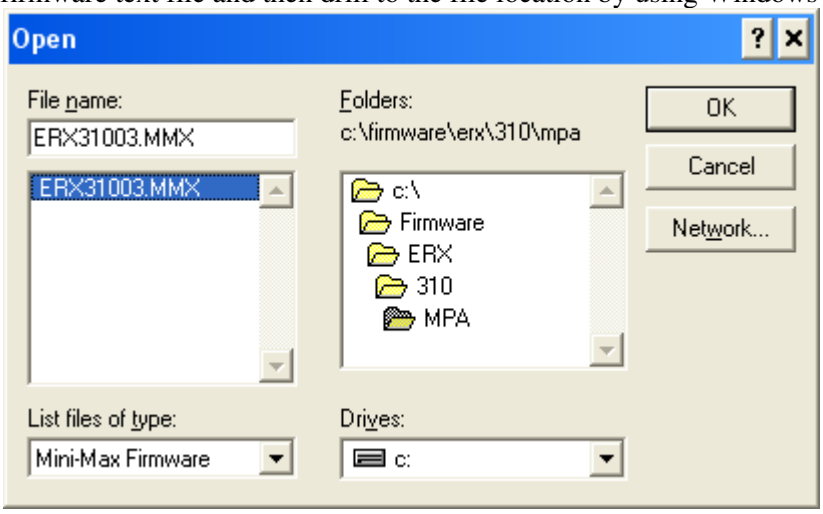
Procedure to Upgrade ERX Recorder Firmware:

1. Connect the MPA (40-2620) to J5 I/O port on the printed circuit board.
2. Connect the Serial Cable (40-1629) from the MPA to the computer COM port.
3. Start Firmware Upgrade Manager
4. From the Menu bar select Setup→Communications, adjust port and baud rate as required

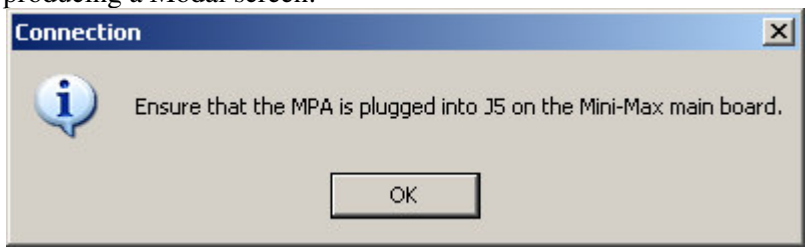


The following steps reference Min-Max command buttons; the ERX and ERX Recorder… based on the operating platform.

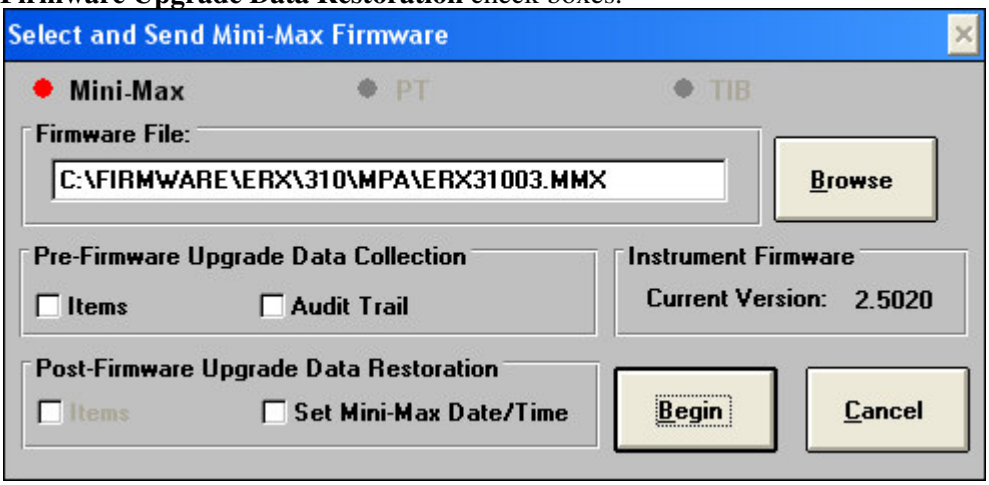
5. Click **Mini-Max,** which generates the **Open** screen prompting for a location of the firmware text file and then drill to the file location by using Windows conventions.



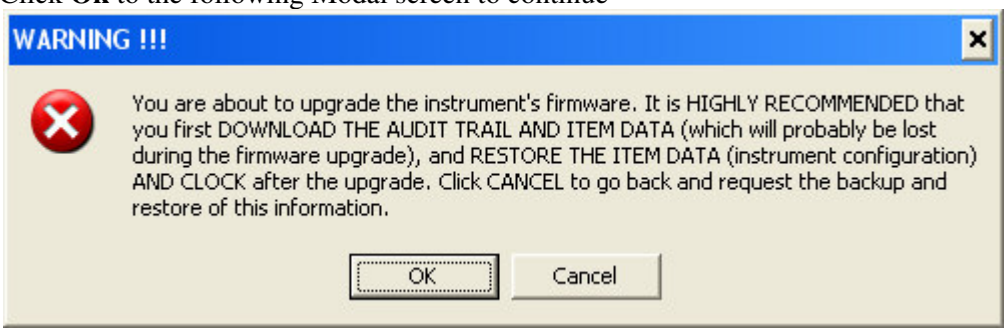
6. Once you have drilled to the location of the file, highlight the desired file and click **Open**, producing a Modal screen:



7. Click **Ok** to establish a serial link to the recorder
8. Click **Begin**, but do not select **Pre-Firmware Upgrade Data Collection** or **Post-Firmware Upgrade Data Restoration** check boxes.



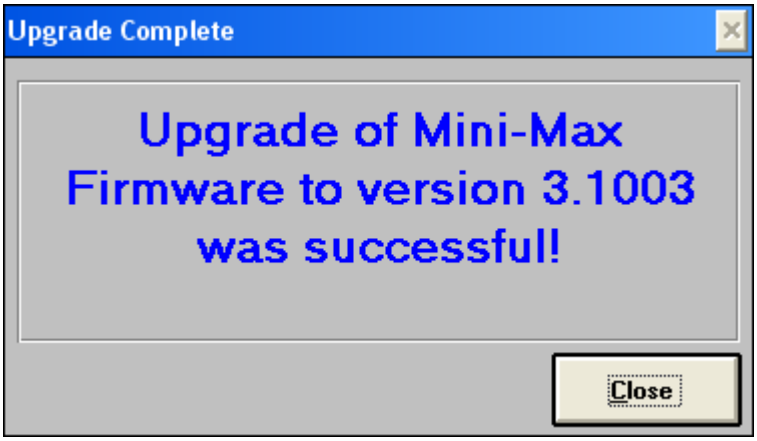
10. Click **Ok** to the following Modal screen to continue


WARNING !!!
You are about to upgrade the instrument's firmware. It is HIGHLY RECOMMENDED that you first DOWNLOAD THE AUDIT TRAIL AND ITEM DATA (which will probably be lost during the firmware upgrade), and RESTORE THE ITEM DATA (instrument configuration) AND CLOCK after the upgrade. Click CANCEL to go back and request the backup and restore of this information.
OK
Cancel

11.A number of status screens will appear:

Connecting to MPA
Erasing Current Firmware
Sending New Firmware
Verifying Firmware Upgrade

12. Finally, if the upgrade procedure was successful, the following screen will display the newly installed firmware version



13. Click **Close**
14. Discount link and re-link to recorder using MasterLink32 software and upload the item file created previously, then load **Non-Cal Items** and **Cal Items** to restore the configuration and calibration items.
15. Reset the date and time in recorder.
16. Verify the ERX Recorder has the proper configuration.

Putting the ERX Recorder into "Shutdown"

Shutdown is a mode of operation invoked by the user prior to placing the instrument into storage or prior to performing some type of board maintenance. The MasterLink32 Link software manual describes the procedure for putting the ERX Recorder into shutdown. There are two types of "Shutdown" that can be induced into the ERX Recorder; Partial and Complete. The connection status of the battery packs determines which type of Shutdown the instrument assumes.

Partial Shutdown

To put the ERX Recorder into "partial shutdown", from MasterLink32 Link software, select and confirm "SHUTDOWN" from the "Instrument" menu. Leave the main battery plugged-in.
In partial shutdown, the recorder's real-time clock will continue to update; however, the sampling of pressure or temperature of the gas no longer occurs. The LCD will show dashes "- - - - - - - - "across the display. The recorder still draws normal background current from the main battery when placed in partial shutdown, and it preserves all item values and audit trail information.
To recover from a partial shutdown, i.e., return to Sample Mode, simply press the MI button.

Complete Shutdown

To put the ERX Recorder into "complete shutdown", from MasterLink32 Link software, select and confirm "SHUTDOWN" from the "Instrument" menu, then unplug the main battery, and remove the super cap jumper. In complete shutdown, the clock of the recorder will stop working and the sampling of pressure or temperature of the gas no longer occurs. The configuration data of the recorder and all item values are retained in E^2PROM. The LCD display will go blank once the batteries are unplugged.
In order to bring the ERX Recorder out of a complete shutdown, simply plug in the main battery and replace the super cap jumper. It will be necessary to reset the date, time, and other items that are not current.

Taking the ERX Recorder "Un-Configured"

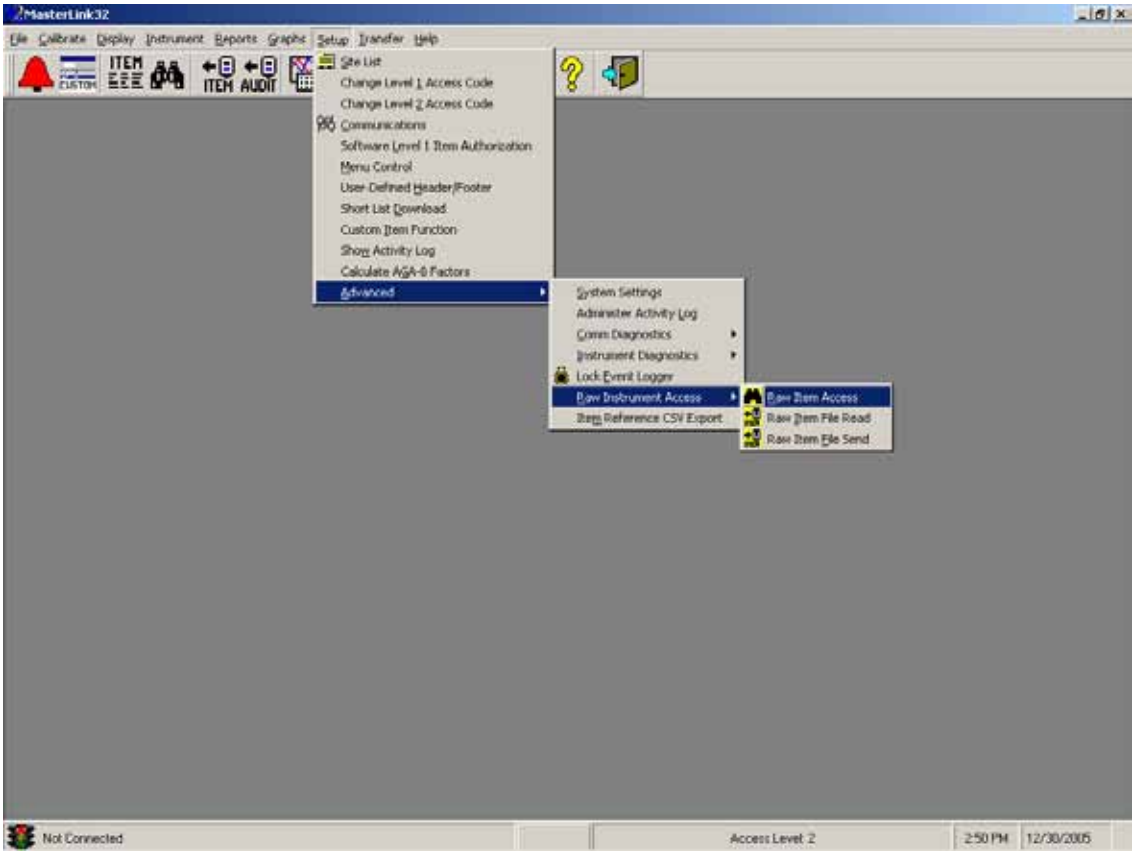
"Un-Configured" refers to resetting the instrument's items to a firmware default.

Firmware defaults are different from the default values in the "Parameter Item List" section. The default values listed in "Parameter Item List" are a combination of firmware and factory defaults.

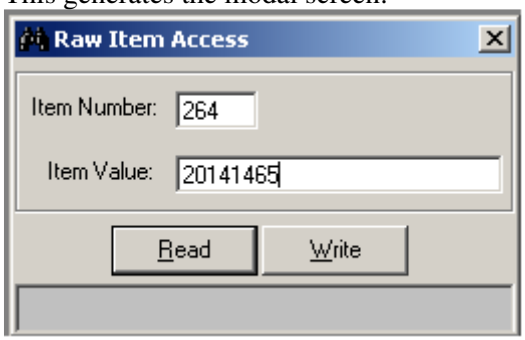
Once the ERX Recorder is "un-configured" Audit Trail, calibration information, and instrument settings are all cleared. Therefore, it is important to record (down load an item file) this information before taking the ERX Recorder un-configured. Specific information about downloading an item file is available in MasterLink32 software.
There are two methods to put an ERX Recorder in un-configured state. The first is with MasterLink32 Software, and the second is a hardware method that is useful if a serial link cannot be established.

Software method:

1. Make a physical connection to the ERX Recorder via serial link.
2. Start MasterLink32
3 Select form the Menu bar Setup→Advance→Raw Instrument Access→Raw Item Access→ left click Raw Item Access



This generates the modal screen:



3. Enter the 264 in the Item Number field
4. Enter 20141465 in the Item Value field
5. Click **Write**
6. Perform a software disconnect link, see MasterLink32 Help, for details

Prior to commissioning the recorder again, reset the date and time and operating parameters by downloading an item file to the recorder or through individual items.

Hardware method--if serial link cannot be established

1. Remove the jumper on JP1, (removes the SuperCap from circuits)
2. Disconnect the power supply from the recorder and allow the LCD to go blank (within 15 seconds)
3. While holding in the MI button, connect the battery and continue to hold the MI button for at least 10 seconds. You should see **Button Down** on the display.
4. To reset the recorder to ERX firmware defaults, release the MI button when the display reads **REL 4D FLT** or to restore the recorder to its preconfigured configuration continue to hold the MI button until the display reads **DISPLAY TEST**, then **RESTORE**, release MI button.
5. Replace JP1, reconnects Super Cap to circuits

*****_Prior to commissioning the recorder again, reset the date and time and operating parameters by downloading an item file to the recorder or through individual items._

Parameter Item List

All items that make up the operating parameters, codes, alarms, calibration references, voltage levels and other information relative to operation or configuration of the Mercury Instruments ERX Recorder are listed below. When connected and linked to a computer, all ERX Recorder items can be displayed or changed in the Display/Item by Function of MasterLink32 software.

Item **Item Name & Description**

061 **Display Test**
A test pattern generated by the microprocessor that gives a visual indication of the status of LCD; pattern energizes all segments of LCD.

104 **A/D FAULT**
This item indicates if an alarm for the A/D Converter was generated. If the microprocessor detects an A/D fault (Analog to Digital), an alarm is initiated and is indicated by placing dots on the LCD and "11111111" at Item 104. "00000000" at Item 104 indicates there is no A/D Converter Alarm. The alarm indicators will remain active until manually cleared (by software). Unlike other instrument alarms, an A/D Fault is usually a hardware failure that requires factory replacement of a component on the main circuit board, or a field replacement of the main board.
Default = 00000000

118	Reference Number 1	000000000
119	Reference Number 2	00000000
127	Instrument Type	10
P3	**Pressure Coefficients**	
150	P3 Pressure Coefficient 27	0.000000
151	P3 Pressure Coefficient 28	0.000000
152	P3 Pressure Coefficient 29	0.000000
153	P3 Pressure Coefficient 30	30.00000
154	P3 Pressure Coefficient 31	0.000000
155	P3 Pressure Coefficient 32	0.000000
156	P3 Interval High Pressure Time	00 00 00
157	P3 Interval High Pressure Date	01-01-04
158	P3 Interval Low Pressure Time	00 00 00
159	P3 Interval Low Pressure Date	01-01-04
173	AT Reset Log Trigger	1
Board Coefficients		
178	P1 Board Coefficients A	0.0000
179	P1 Board Coefficients B	1.0000
180	P1 Board Coefficients C	0.0000
181	P1 Board Coefficients D	1.0000
265	Reserved MA	00000000
266	Reserved MD	00000000
267	Reserved MC	00000000

Item **Item Name & Description**

P1	**Pressure Coefficients**	
301	P1 Pressure Coefficient 1	0.000000
302	P1 Pressure Coefficient 2	30.00000
303	P1 Pressure Coefficient 3	0.000000
304	P1 Pressure Coefficient 4	0.000000
305	P1 Pressure Coefficient 5	0.000000
306	P1 Pressure Coefficient 6	30.00000
307	P1 Pressure Coefficient 7	0.000000
308	P1 Pressure Coefficient 8	0.000000
309	P1 Pressure Coefficient 9	0.000000
310	P1 Pressure Coefficient 10	30.00000
311	P1 Pressure Coefficient 11	0.000000
312	P1 Pressure Coefficient 12	0.000000
313	P1 Pressure Coefficient 13	0.000000
314	P1 Pressure Coefficient 14	30.00000
315	P1 Pressure Coefficient 15	0.000000
316	P1 Pressure Coefficient 16	0.000000
317	P1 Pressure Coefficient 17	0.000000
318	P1 Pressure Coefficient 18	30.00000
319	P1 Pressure Coefficient 19	0.000000
320	P1 Pressure Coefficient 20	0.000000
321	P1 Pressure Coefficient 21	0.000000
322	P1 Pressure Coefficient 22	30.00000
323	P1 Pressure Coefficient 23	0.000000
324	P1 Pressure Coefficient 24	0.000000
325	P1 Pressure Coefficient 25	0.000000
326	P1 Pressure Coefficient 26	30.00000
327	P1 Pressure Coefficient 27	0.000000
328	P1 Pressure Coefficient 28	0.000000
329	P1 Pressure Coefficient 29	0.000000
330	P1 Pressure Coefficient 30	30.00000
331	P1 Pressure Coefficient 31	0.000000
332	P1 Pressure Coefficient 32	0.000000

333 **Call-In Trigger**

Selection to determine what activity will cause an instrument call-in.
Select:

0 - No Call-in
Default: 1 - Alarm Call-in only
2 - Scheduled Call-in only
3 - Alarm & Scheduled Call-In

334 **Scheduled Call-In Date**

Date of next scheduled call-in. The host software must reset this after each call.
Default = 01-01-00

Item **Item Name & Description**

335 **Scheduled Call-In Time**
Time of next scheduled call-in. The host software may reset as needed or be reused for next call-in.
Default = 01:00:00

338 **Scheduled Call-In Alarm**
Status of scheduled call-in activity, '11111111' indicates call-in activity since last interrogation and is intended to be reset to zero after each read. '00000000' indicates no activity since last interrogation.
Default: 00000000

339 **Scheduled Call-In Phone #**
Phone number used for scheduled call-in.

340 **Digi-Span Mode**
Selection that determines what mode the ERX Recorder pulse output channels are set to.
Default: 0 = No Digi-Span--Standard Pulse Out
1 = Gas Override--Pulse Channel A on
2 = Oil Override--Pulse Channel B on
3 = Automatic--Both Channels off

P2	**Pressure Coefficients**	
341	P2 Pressure Coefficient 1	0.000000
342	P2 Pressure Coefficient 2	30.00000
343	P2 Pressure Coefficient 3	0.000000
344	P2 Pressure Coefficient 4	0.000000
345	P2 Pressure Coefficient 5	0.000000
346	P2 Pressure Coefficient 6	30.00000
347	P2 Pressure Coefficient 7	0.000000
348	P2 Pressure Coefficient 8	0.000000
349	P2 Pressure Coefficient 9	0.000000
350	P2 Pressure Coefficient 10	30.00000
351	P2 Pressure Coefficient 11	0.000000
352	P2 Pressure Coefficient 12	0.000000
353	P2 Pressure Coefficient 13	0.000000
354	P2 Pressure Coefficient 14	30.00000
355	P2 Pressure Coefficient 15	0.000000
356	P2 Pressure Coefficient 16	0.000000
357	P2 Pressure Coefficient 17	0.000000
358	P2 Pressure Coefficient 18	30.00000
359	P2 Pressure Coefficient 19	0.000000
360	P2 Pressure Coefficient 20	0.000000
361	P2 Pressure Coefficient 21	0.000000
362	P2 Pressure Coefficient 22	30.00000
363	P2 Pressure Coefficient 23	0.000000
364	P2 Pressure Coefficient 24	0.000000
365	P2 Pressure Coefficient 25	0.000000

Item **Item Name & Description**

366	P2 Pressure Coefficient 26	30.00000
367	P2 Pressure Coefficient 27	0.000000
368	P2 Pressure Coefficient 28	0.000000
369	P2 Pressure Coefficient 29	0.000000
370	P2 Pressure Coefficient 30	30.00000
371	P2 Pressure Coefficient 31	0.000000
372	P2 Pressure Coefficient 32	0.000000

408 **P3 Pressure Unit**
Selection for the unit-of-measure for P2 pressure item 501, if changed to a different type, all P2 pressure-related items are converted and displayed to the new unit-of-measure. See below for possible pressure unit choices.

Default: 0-PSIG
1-PSIA
2-kPA
3-mPa
4-Bar
5-mBar
6-KGcm2
7-in WC
8-in HG
9-mm HG
10-Oz

410 **P3 Pressure Calibration Date**
Date of the most recent P3 calibration
Default: 01-01-04

411 **P3 Pressure Transducer Serial Number**
Default: 00000000

412 **P3 Pressure Range**
P3 transducer in PSI
Default: 333.00

414 **P3 Pressure Zero Offset**
The most recent span value for P3 pressure transducer and obtained during a pressure span calibration. A value that is normally very close to 0.0000 and recalculated on each Pressure Span Calibration.
Default = 0.0000

415 **P3 Pressure Previous Zero Offset**
The previous P3 zero offset value recorded in item 414, updated on each calibration.
Default: 0.0000

Item **Item Name & Description**

417 **P3 Pressure Span Factor**
The most recent span value factor for P3 pressure transducer and obtained during a pressure span calibration. The value is normally very close to 1.0000 and recalculated on each pressure span calibration.
Default = 1.0000

418 **P3 Pressure Previous Span Factor**
The previous P3 span factor recorded in item 417, updated on each calibration.
Default: 1.0000

419 **P3 Pressure Range User**
The upper pressure range limit, automatically scaled to the pressure units selected at item 408. If PSI is the selected pressure units, then item 419 will be the same as item 412. NOTE: The value at Item 419 and maybe manually edited to a rounded-off number, if desired.
Default = 333.00

420 **P3 Gas Pressure**
Gas pressure measured at the last wake-up. The pressure reading is scaled to the unit of measure selected at item 408.

421 **P3 Average Pressure**
P3 average pressure that occurred during the log interval

422 **P3 Interval High Pressure**
Highest P3 pressure reading recorded during the log interval.

423 **P3 Interval Low Pressure**
Lowest P3 pressure reading recorded during the log interval.

424 **P3 Current Day Average Pressure**
Average P3 pressure readings recorded for the current day.

425 **P3 Previous Day Average Pressure**
Previous value recorded in item 424

426 **P3 Maximum Pressure**
Maximum P3 pressure reading recorded since the recorder was last reset.
Default: 0.000

427 **P3 Maximum Pressure Time**
Time of maximum P3 pressure reading was recorded since the recorder was last reset.
Default: 00 00 00

428 **P3 Maximum Pressure Date**
Date of the maximum P3 pressure reading since the recorder was last reset.
Default: 01-01-04

Item **Item Name & Description**

429 **P3 Minimum Pressure**
Minimum P3 pressure reading recorded since the recorder was last reset.
Default: 333.00

430 **P3 Minimum Pressure Time**
Time of minimum P3 pressure reading was recorded since the recorder was last reset.
Default: 00 00 00

431 **P3 Minimum Pressure Date**
Date of the minimum P3 pressure reading since the recorder was last reset.
Default: 01-01-04

Board Coefficients

441	P2 Board Coefficients	A	0.0000
442	P2 Board Coefficients	B	1.0000
443	P2 Board Coefficients	C	0.0000
444	P2 Board Coefficients	D	1.0000
445	P3 Board Coefficients	A	0.0000
446	P3 Board Coefficients	B	1.0000
447	P3 Board Coefficients	C	0.0000
448	P3 Board Coefficients	D	1.0000

451 **P3 High Alarm**
Binary indication whether a P3 high alarm occurred.
Default: 00000000, No alarm
11111111, Alarm

452 **P3 Low Alarm**
Binary indication whether a P3 low alarm occurred.
Default: 00000000, No alarm
11111111, Alarm

453 **P3 Current Day High Pressure**
Maximum P3 pressure reading recorded during the current day.
Default: 0.000

454 **P3 Current Day Low Pressure**
Minimum P3 pressure reading recorded during the current day.
Default: 333.00

455 **P3 Pressure High Alarm Limit**
User defined P3 pressure limits that if exceeded will cause the recorder to alarm.

456 **P3 Pressure Low Alarm Limit**
P3 pressure limits that if exceeded will cause the recorder to alarm.
Default: -1.00

Item **Item Name & Description**

457 **P3 Current Day High Time**
Time of P3 maximum pressure reading was recorded during the current day.
Default: 00 00 00

458 **P3 Current Day High Date**

459 **P3 Pressure Dead Band**
A hysteresis band that provides a buffer below the P3 pressure high limit and above the P3 low pressure limit when alarms are automatically cleared by RBX. The user-specified value determines the magnitude of the band. The P3 pressure measurement must pass completely through the dead band before the pressure alarm is automatically cleared.
Default: 5.00

481 **Max Audit Trail Records**
Maximum number of Audit Trail records
Default: 5045

483 **Alarm Message**
Optional alphanumeric character (8) that is a user-defined text string is displayed on the LCD in 2-second intervals when an alarm has occurred. That is, typing the word 'ALARM' in item 483 will cause the display to alternate between a pressure reading and ALARM every 8 seconds.
Default: Blank

484 **Alarm Channel Control**
Selection to determine if the Alarm Channel at TB2 is used as an alarm pulse output or used to control power of an external device; that is cellular phones, modems, and etc.

	Code	Value
Default:	0	Alarm Pulse Output
	1	Modem Power Control

498 **P3 Current Day Low Time**
Time of lowest recorded P3 pressure reading during the current day.
Default: 00 00 00

499 **P3 Current Day Low Date**
Default: 01-01-04

500 **P1 Gas Pressure**
The last recorded measurement of gas pressure from the primary pressure transducer and scaled to the selected pressure units at item 549.
Default: 0.00

501 **P2 Gas Pressure**
The last recorded measurement of gas pressure from the primary pressure transducer and scaled to the selected pressure units at item 550.
Default: 0.00

Item **Item Name & Description**

502 **Temperature**

The last recorded measurement of gas temperature and is scaled to the selected temperature units at 551.

Default: -40.00

503 Case Temperature

The last recorded measurement of the air temperature inside the recorder, considered an ambient temperature measurement.

Default: -40.00

504 Case Maximum Temperature

The highest recorded case temperature measurement since the recorder was last reset.

Default: -40.00

505 Case Minimum Temperature

The lowest recorded case temperature measurement since the recorder was last reset.

Default: 165.00

506 P1 Pressure Calibration Zero Offset

The most recent span value for P1 pressure transducer and obtained during a pressure span calibration. A value that is normally very close to 1.0000 and recalculated on each Pressure Span Calibration.

Default = 0.000

507 P1 Previous Calibration Zero Offset

The previous P1 span factor recorded in item 506 and is updated on each calibration.

Default: 0.000

508 P1 Pressure Calibration Span Factor

The most recent span value factor for P1 pressure transducer and obtained during a pressure span calibration. The value is normally very close to 1.0000 and recalculated on each pressure span calibration.

Default = 1.0000

509 P1 Previous Calibration Span Factor

The previous P1 span factor recorded in item 508 and is updated on each calibration.

Default: 1.0000

510 P2 Calibration Zero Offset

The most recent span value for P2 pressure transducer and obtained during a pressure span calibration. A value that is normally very close to 0.0000 and recalculated on each Pressure Span Calibration.

Default: 0.0000

511 P2 Previous Calibration Zero Offset

The previous P2 zero offset value recorded in item 510 and is updated on each calibration.

Default: 0.0000

Item Item Name & Description

512 P2 Pressure Calibration Span Factor

The most recent span value factor for P2 pressure transducer and obtained during a pressure span calibration. The value is normally very close to 1.0000 and recalculated on each pressure span calibration.

Default = 1.0000

513 P2 Previous Calibration Span Factor

The previous P2 span factor recorded in item 512 and is updated on each calibration.

Default: 0.000

514 Temperature Calibration Zero

The current temperature zero offset calibration constant. The value is normally very close to 0.00 and calculated on each temperature zero calibration.

Default: 0.00

515 Temperature Previous Calibration Zero Offset

The previous temperature zero offset constant recorded in item 514 and is updated on each calibration.

Default: 0.00

516 Temperature Calibration Span

The most recent temperature span value factor obtained during a temperature span calibration. The value is normally very close to 1.0000 and recalculated on each temperature span calibration.

Default: 1.0000

517 Temperature Previous Calibration Span Factor

The previous temperature span factor recorded in item 516, updated on each calibration.

Default: 1.0000

518 P1 Pressure Calibration Date

The date automatically obtained form item 583 at the time of the P1 pressure zero calibration.

Default: 01-01-04

519 P2 Pressure Calibration Date

The date automatically obtained form item 583 at the time of the P1 pressure zero calibration.

Default: 01-01-04

520 Temperature Calibration Date

The date automatically obtained form item 583 at the time of the temperature zero calibration.

Default: 01-01-04

521 Battery Voltage Reading

Battery voltage reading obtained during the most recent wake-up.

Item **Item Name & Description**

522 **Battery Low Volt Limit**
Voltage limit at which the recorder will automatically generate a low voltage alarm if the battery reading, reads below limit.
Default: 4.30

523 **Shutdown Voltage Limit**
The voltage level at which "..H.E.L.P.." is displayed on the LCD as an indication that the battery is about dead and needs to be replaced.
Default: 4.00

528 **Clear Alarms via LCD**
This item enables the clearing of all active alarms via the MI Logo. During the Display List Mode, the "E.E.E.E.E.E.E.E." display will appear after scrolling through all active alarms. Allow the recorder to time-out (1-minute) at this display to clear the alarms. If the MI Logo is used to scroll to the next display item in the list the alarms are **not** cleared.
Code
0- No
Default: 1- Yes

530	Display List 1 Item 1	580, Site ID Number
531	Display List 1 Item 2	582, Time
532	Display List 1 Item 3	583, Date
533	Display List 1 Item 4	503, Case Temperature
534	Display List 1 Item 5	521, Battery Voltage Reading
535	Display List 1 Item 6	255, Reserved

536 **Live Display Enable**
If configured, the recorder will display live P1, P2, and P3 live pressure and temperature readings as part of the Display List. If enabled, the first live parameter will follow the last Display List 1 item and prior to the first Display List 2 item. All live parameters have a 30-minute time-out, instead of the usual 1-minute time-out.
Default: Same as item 576

537	Display List 2 Item 1	631, P1 Maximum
538	Display List 2 Item 2	637 Maximum Pressure Time
539	Display List 2 Item 3	638, Maximum Pressure Date
540	Display List 2 Item 4	632, P1 Minimum
541	Display List 2 Item 5	639, Minimum Pressure Time
542	Display List 2 Item 6	640, Minimum Pressure Date
543	Display List 2 Item 7	651, P1 Interval Low Pressure
544	Display List 2 Item 8	650, P1 Interval High
545	Display List 2 Item 9	649, P1 Interval Average
546	Display List 2 Item 10	255, Reserved
547	Display List 2 Item 11	255, Reserved
548	Display List 2 Item 12	255, Reserved

Item **Item Name & Description**

549 **Pressure 1 Units**

Selection for the unit-of-measure for P1 pressure item 500 and if changed to a different type, all P1 pressure related items are converted and displayed in the new unit-of-measure. See below for possible pressure unit choices.

550 **Pressure 2 Units**

Selection for the unit-of-measure for P2 pressure item 501 and if changed to a different type, all P2 pressure related items are converted and displayed to the new unit-of-measure.

Possible choices for Item 549, 550, and 408 are:.

	Code	Value
Default:	0	PSIG
	1	PSIA
	2	kPA
	3	mPa
	4	Bar
	5	mBar
	6	KGcm2
	7	in WC
	8	in HG
	9	mm HG
	10	Oz
	11	Volts
	12	Millivolts

551 **Temperature Units**

Selection for the unit-of-measure for gas temperature item 502 and if changed to a different type, all temperature related items are converted and displayed to the new unit-of-measure. See below for possible temperature unit choices.

	Code	Value
Default:	0	Fahrenheit
	1	Celsius
	2	Rankine
	3	Kelvin

552 **Pressure Display Resolution**

This item controls the how many decimal place that recorder will displayed and applies to all pressure units.

	Code	Value
	0	XXXXXXXX.
	1	XXXXXXX.X
Default:	2	XXXXXX.XX
	3	XXXXX.XXX

Item **Item Name & Description**

553 **P1 Pressure High Alarm Limit**
The pressure reading that automatically produces a high-pressure alarm. This value is a user selectable item and is normally set somewhere between 50 & 100% of transducer range.
Default: 111.00

554 **P1 Pressure Low Alarm Limit**
The pressure reading that automatically produces a low-pressure alarm. .
Default: -1.00

555 **P2 Pressure High Alarm Limit**
The pressure reading that automatically produces a high-pressure alarm. This value is a user selectable item and is normally set somewhere between 50 & 100% of transducer range.
Default: 222.00

556 **P2 Pressure Low Alarm Limit**
The pressure reading that automatically produces a low-pressure alarm. .
Default: -1.00

557 **Temperature High Alarm Limit**
The temperature reading that automatically produces a high-temperature alarm. This value is a user selectable item.
Default: 165.00

558 **Temperature Low Alarm Limit**
The temperature reading that automatically produces a low-temperature alarm. .
Default: -35.00

Alarm Status Indicators for items 559 through 568**:**

	Code	Value
Default:	00000000	No alarm
	11111111	Alarm

A 50-millisecond alarm pulse, transmitted out the alarm channel occurs at the time the recorder alarms. All alarms must be cleared before the recorder will again output a 50-millisecond alarm pulse.

559 **P1 High Pressure Alarm**

	Code	Value
Default:	00000000	No alarm
	11111111	Alarm

560 **P1 Low Pressure Alarm**

	Code	Value
Default:	00000000	No alarm
	11111111	Alarm

Item **Item Name & Description**

561 **P2 High Pressure Alarm**

	Code	Value
Default:	00000000	No alarm
	11111111	Alarm

562 **P2 Low Pressure Alarm**

	Code	Value
Default:	00000000	No alarm
	11111111	Alarm

563 **Temperature High Alarm**

A gas temperature reading that will automatically produce a high temperature alarm. This value is user selectable and is normally set to a value that is greater than the average flowing temperature. Setting the limit to 170.00 can defeat a high temperature alarm.

Default: 170.00.

558 **Temperature Low Alarm Limit**

A gas temperature reading that will automatically produce a low temperature alarm. This value is user selectable and is normally set to a value that is greater than the average flowing temperature. Setting the limit to -40.00 can defeat a low temperature alarm.

Default: -40.00.

568 **Alarm Output**

	Code	Value
Default:	00000000	No alarm
	11111111	Alarm

569 **Transducer Type**

This item is for reference only and does not effect the pressure transducer calibration or performance.

	Code	Value
Default:	0	Gauge
	1	Absolute

570 **P1 Pressure Range PSI**

The upper limit of the installed P1 pressure transducer and is always expressed in PSI.

Default: 111.00

571 **P2 Pressure Range PSI**

The upper limit of the installed P2 pressure transducer and is always expressed in PSI.

Default: 222.00

572 **P1 Pressure Range User**

The upper pressure range limit, automatically scaled to the pressure units selected at item 549. If PSI is the selected pressure units, then item 572 will be the same as item 571. NOTE: The value at item 572 may be manually edited to a rounded-off number, if desired.

Default: 111.00

Item **Item Name & Description**

573 **P2 Pressure Range User**
The upper pressure range limit, automatically scaled to the pressure units selected at item 550. If PSI is the selected pressure units, then item 573 will be the same as item 572. NOTE: The value at item 573 may be manually edited to a rounded-off number, if desired.
Default: 111.00

574 **P1 Transducer Serial Number**
Note: Forcing factory defaults will not change the value of this item.
Default: 00000000

575 **P2 Transducer Serial Number**
Note: Forcing factory defaults will not change the value of this item.
Default: 00000000

576 **Instrument Configuration**
Selection that defines the number and type of transducers (pressure or temperature) installed in a particular recorder. MasterLink32 uses this item to determine number and type of transducers installed in the recorder. If improperly configured will limit the functionality of MasterLink32.

	Code	Value
Default:	1	P1
	2	
	3	P1 & P2
	4	T
	5	P1 & T
	7	P1, P2, & T
	8	P1, P2, P3,
	9	P1, P2, P3, & T

577 **Recorder Serial Number**
The numerical portion of the instrument's serial number label that is located in the inside of door. Disregard the leading zero, the first two digits indicate the year of manufacture, and the last five digits are assigned sequentially from the beginning of the year.
Default: 0

578 **Firmware Version**
This item contains the recorder's operating firmware version number. Automatically insert when a firmware file it upload in the recorder.

579 **Instrument Type**
Use by MasterLink32 and other software programs that identifies the instrument type.

580 **Site ID Number**
First of two numeric fields that are used by MasterLink32 and other software programs to identify the recorder and up to eight digits may be used and the only valid characters are 0-9.
Default: Instrument serial number

Item **Item Name & Description**

581 **Site ID Number Part 2**

Second of two numeric fields that are used by MasterLink32 and other software programs to identify the recorder and up to eight digits may be used and the only valid characters are 0-9.

Default: Instrument serial number

582 **Time**

Settable Real Time Clock that displays hours, minutes and seconds in 24-hour "military format," e.g., 14**:**30**:**02 would indicate 2 seconds past 2**:**30 PM. This Time (and Date, item 583) is used to time-stamp records stored in data logger memory.

Default: 12 00 00

583 **Date**

A numeric field that indicates the day, month and year of a calendar year and which automatically tracks the days in the month, including a leap year. Leading zeros are required, where applicable. Date and time are used to time-stamp records stored in data logger.

Default: 01-01-04

584 **Date Format**

A user configurable item that allows the user to determine how a date is entered and displayed.

	Code	Value
Default:	0	MM - DD - YY
	1	DD - MM - YY

585 **Log Interval**

User selected period that determines how often a time-stamped record is placed in the Audit Trail and is identified by “TIME”. All available log intervals will produce a time-stamped record at the top-of-hour. Log Intervals less than 60 minutes will also time-stamp records at each selected interval, starting at the top of the hour.

	Code	Value
	0	24 Hours
Default:	1	60 Minutes
	2	30 Minutes
	3	15 Minutes
	4	5 Minutes
	5	1 Minute

586 **Sample Interval**

User selected time period that determines how often the recorder will wake up to measure (sample) the analog inputs, i.e., P1, P2, P3 T, Case Temp, and Battery Voltage.

	Code	Value
	0	60 Seconds
	1	30 Seconds
	2	15 Seconds
Default	3	10 Seconds
	4	5 Seconds

Item **Item Name & Description**

587 **Start Time**

A user selected time of day when selected items are re-zeroed and the next day's calculations begin. Generally the "Start Time" is set to midnight to coincide with the calendar day, but other top of the hour times may be entered.

Default: 00 00 00

588 **Instrument Baud Rate**

Codes (0-8) are to select the instrument's baud rate for all local serial connection. If Auto baud is selected the instrument will connect to the computer at the baud rate at which the software is set. If any other selection is made the computer baud rate must match that of the instrument in order to communicate.

Code	Value	Code	Value
0	9600	5	Not Used
1	4800	6	19200
2	2400	7	38400
3	1200	8	Auto Baud - **Default**
4	Not Used		

Audit Report Items-Default

The ten user-selectable recorder items that can be stored in memory and then used to create historical data based on the selected Audit Trail items. Any of the instrument's items can be selected, but generally should be restricted to items whose value can be graphed, such as pressure or temperature, etc. Any report position can be left blank (unused) by inserting the number "255" instead of an item code number.

Pressure only default Audit Trail

589	Report Item 2	500, P1 Pressure
590	Report Item 2	651, P1 Interval Low Pressure
591	Report Item 3	650, P1 Interval High Pressure
592	Report Item 4	649, P1 Interval Avg. Pressure
593	Report Item 5	672, P1 Current Day Low Press.
594	Report Item 6	681, P1 Current Day Low Time
595	Report Item 7	671, P1 Current Day High Press
596	Report Item 8	679, P1 Current Day Hi time
597	Report Item 9	503, Case Temperature
598	Report Item 10	521, Battery Voltage Reading

599 **Time Trigger Enable**

When enabled, item 585 log interval will cause an Audit Trail record to be placed in memory and is indicated by the log trigger: Time.

Code	Value
0	Inactive
Default: 1	**Active**

Item **Item Name & Description**

600 **Calibration Trigger Enable**
When enabled, a calibration of the recorder will cause an Audit Trail record to be placed in memory and is indicated by the log trigger: Calibration

	Code	Value
	0	Inactive
Default:	1	Active

601 **Alarm Trigger Enable**
When enabled, the occurrence of any alarm will cause an Audit Trail record to be placed in memory and is indicated by the log trigger: Alarm

	Code	Value
	0	Inactive
Default:	1	Active

602 **Serial Trigger Enable**
When enabled, any successful sign-on through the serial port will cause an Audit Trail record to be placed in memory and is indicated by the log trigger: Serial

	Code	Value
	0	Inactive
Default:	1	Active

603 **Mag Trigger Enable-MI Logo Button**
When enabled, anytime the MI Logo button is used to initiate the display list mode, an Audit Trail record is placed in memory and is indicated by the log trigger: Mag

	Code	Value
	0	Inactive
Default:	1	Active

604 **Change Trigger Enable**
When enabled, anytime a user changes an item value, an Audit Trail record is placed in memory and is indicated by the log trigger: Change

	Code	Value
	0	Inactive
Default:	1	Active

P3 Pressure Coefficients 1-26

605	P3 Pressure Coefficient 1	0.000000
606	P3 Pressure Coefficient 2	30.00000
607	P3 Pressure Coefficient 3	0.000000
608	P3 Pressure Coefficient 4	0.000000
609	P3 Pressure Coefficient 5	0.000000
610	P3 Pressure Coefficient 6	30.00000
611	P3 Pressure Coefficient 7	0.000000
612	P3 Pressure Coefficient 8	0.000000
613	P3 Pressure Coefficient 9	0.000000
614	P3 Pressure Coefficient 10	30.00000
615	P3 Pressure Coefficient 11	0.000000

Item	Item Name & Description	
616	P3 Pressure Coefficient 12	0.000000
617	P3 Pressure Coefficient 13	0.000000
618	P3 Pressure Coefficient 14	30.00000
619	P3 Pressure Coefficient 15	0.000000
620	P3 Pressure Coefficient 16	0.000000
621	P3 Pressure Coefficient 17	0.000000
622	P3 Pressure Coefficient 18	30.00000
623	P3 Pressure Coefficient 19	0.000000
624	P3 Pressure Coefficient 20	0.000000
625	P3 Pressure Coefficient 21	0.000000
626	P3 Pressure Coefficient 22	30.00000
627	P3 Pressure Coefficient 23	0.000000
628	P3 Pressure Coefficient 24	0.000000
629	P3 Pressure Coefficient 25	0.000000
630	P3 Pressure Coefficient 26	30.00000

631 P1 Maximum Pressure

The maximum P1 pressure sample reading since the last reset.

Default: -1.00

632 P1 Minimum Pressure

The minimum P1 pressure sample reading since the last reset.

Default: 9999.00

633 P2 Maximum Pressure

The maximum P2 pressure sample reading since the last reset.

Default: -1.00

634 P2 Minimum Pressure

The minimum P2 pressure sampled reading since the last reset.

Default: 9999.00

635 Gas Temperature Maximum

The maximum temperature sample reading since the last reset.

Default: -40.00

The minimum temperature sample reading since the last reset.

Default: 165.00

637 P1 Maximum Pressure Time

The time the recorder's maximum P1 pressure sample reading occurred, since the recorder was, last reset.

Default: 00 00 00

638 P1 Maximum Pressure Date

The date the recorder's maximum P1 pressure sample reading occurred, since the recorder was last reset.

Default: 01-01-04

Item **Item Name & Description**

639 **P1 Minimum Pressure Time**
The time the recorder's minimum P1 pressure sample reading occurred, since the recorder was, last reset.
Default: 00 00 00

640 **P1 Minimum Pressure Date**
The date the recorder's minimum P1 pressure sample reading occurred, since the recorder was last reset.
Default: 01-01-04

641 **P2 Maximum Time**
The time the recorder's maximum P2 pressure sample reading occurred, since the recorder was last reset.
Default: 00 00 00

642 **P2 Maximum Date**
The date the recorder's maximum P2 pressure sample reading occurred, since the recorder was last reset.
Default: 01-01-04

643 **P2 Minimum Time**
The time the recorder's minimum P2 pressure sample reading occurred, since the recorder was last reset.
Default: 00 00 00

644 **P2 Minimum Date**
The date the recorder's minimum P2 pressure sample reading occurred, since the recorder was last reset.
Default: 01-01-04

645 **Temperature Maximum Time**
The time the recorder's maximum T1 temperature sample reading occurred, since the recorder was last reset.
Default: 00 00 00

646 **Temperature Maximum Date**
The date the recorder's maximum T1temperature sample reading occurred, since the recorder was last reset.
Default: 01-01-04

647 **Temperature Minimum Time**
The time the recorder's minimum T1 temperature sample reading occurred, since the recorder was last reset.
Default: 00 00 00

Item	Item Name & Description

648 Temperature Minimum Date

The time the recorder's minimum T1 temperature sample reading occurred, since the recorder was last reset.

Default: 01-01-04

P1 highest pressure reading that occurred during the interval.

Default: -1.00

651 P1 Interval Low

P1 lowest pressure reading that occurred during the interval.

Default: 9999.99

652 P2 Interval Average

P2 pressure reading averages of the entire recorder's sampled readings during the interval.

Default: -1.00

653 P2 Interval High

P2 highest pressure reading that occurred during the interval.

Default: -1.00

654 P2 Interval Low

P2 lowest pressure reading that occurred during the interval.

Default: 9999.99

655 Temperature Interval Average

T1 temperature reading averages of the entire recorder's sampled readings during the interval.

Default: -40.00

656 Temperature Interval High

T1 temperature highest sample reading that occurred during the interval.

Default: -40.00

657 Temperature Interval Low

T1 temperature lowest sample reading that occurred during the interval.

Default: 165.00

658 P1 Interval High Time

The time at which the recorder's maximum P1 pressure reading (item 650) occurred during the interval.

Default: 00 00 00

The date at which the recorder's maximum P1 pressure reading (item 650) occurred, during the interval.

Default: 01-01-04

Item **Item Name & Description**

660 **P1 Interval Low Time**
The time at which the recorder's minimum P1 pressure reading (item 651) occurred during the interval.
Default: 00 00 00

661 **P1 Interval Low Date**
662 The date at which the recorder's minimum P1 pressure reading (item 651) occurred during the interval.
Default: 00 00 00

663 The time at which the recorder's maximum P2 pressure reading (item 653) occurred during the interval
Default: 00 00 00

664 The date at which the recorder's maximum P2 pressure reading (item 653) occurred during the interval.
Default: 01-01-04

665 The time at which the recorder's minimum P2 pressure reading (item 654) occurred during the interval.
Default: 00 00 00

665 **P2 Interval Low Date**
The date at which the recorder's minimum P2 pressure reading (item 654) occurred during the interval.
Default: 01-01-04

666 The time at which the recorder's maximum T1 temperature sample reading (item 656) occurred during the interval.
Default: 00 00 00

667 **Temperature Interval High Date**
The date at which the recorder's maximum T1 temperature sample reading (item 656) occurred during the interval.
Default: 01-01-04

668 **Temperature Interval Low Time**
The time at which the recorder's minimum T1 temperature sample reading (item 656) occurred during the interval.
Default: 00 00 00

669 **Temperature Interval Low Date**
The date at which the recorder's minimum T1 temperature sample reading (item 656) that occurred during the interval.
Default: 01-01-04

670 **P1 Current Day Average**
Recorder's average P1 sampled pressure readings that occurred during the current day.
Default: -1.00

Item	Item Name & Description

671 The maximum P1 pressure sampled readings that occurred during the current day.
Default: -1.00

672 **P1 Current Day Low**
The minimum P1 pressure sampled readings that occurred during the current day.
Default: 9999.99

673 **P2 Current Day Average**
Recorder's average P2 sampled pressure readings that occurred during the current day.
Default: -1.00

674 **P2 Current Day High**
The maximum P2 pressure sampled reading that occurred during the current day.
Default: -1.00

675 **P2 Current Day Low**
The minimum P2 pressure sampled reading that occurred during the current day.
Default: 9999.99

676 **Temperature Current Day Average**
Recorder's average T1 temperature sampled readings that occurred during the current day.
Default: -40.00

677 **Temperature Current Day High**
The maximum T1 temperature sampled reading that occurred during the current day.
Default: -40.00

678 **Temperature Current Day Low**
The minimum T1 temperature sampled reading that occurred during the current day.
Default: 165.00

679 **P1 Current Day High Time**
The date at which the recorder's maximum P1 pressure reading (item 671) occurred during the current day.
Default: 01-01-04

680 **P1 Current Day High Date**
The date at which the recorder's maximum P1 pressure reading (item 671) occurred during the current day.
Default: 01-01-04

681 **P1 Current Day Low Time**
The time at which the recorder's minimum P1 pressure reading (item 671) occurred during the current day.
Default: -1.00

Item **Item Name & Description**

682 **P1 Current Day Low Date**
The date at which the recorder's minimum P1 pressure reading (item 672) occurred during the current day.
Default: 9999.99

683 **P2 Current Day High Time**
The time at which the recorder's maximum P2 pressure reading (item 674) occurred during the current day.
Default: 00 00 00

684 **P2 Current Day High Date**
The date at which the recorder's maximum P2 pressure reading (item 674) occurred during the interval.
Default: 01-01-04

685 **P2 Current Day Low Time**
The time at which the recorder's minimum P2 pressure reading (item 675) occurred during the current day.
Default: 00 00 00

686 **P2 Current Day Low Date**
The date at which the recorder's minimum P2 pressure reading (item 675) occurred during the current day.
Default: 01-01-04

687 **Temperature Current Day High Time**
The time at which the recorder's minimum T1 temperature reading (item 677) occurred during the current day.
Default: 00 00 00

688 **Temperature Current Day High Date**
The date at which the recorder's maximum T1 temperature reading (item 677) occurred during the current day.
Default: 01-01-04

689 **Temperature Current Day Low Time**
The time at which the recorder's minimum T1 temperature reading (item 678) occurred during the current day.
Default: 00 00 00

690 **Temperature Current Day Low Date**
The date at which the recorder's minimum T1 temperature reading (item 678) occurred during the current day.
Default: 01-01-04

691 **P1 Previous Day Average Pressure**
Recorder's average P1 sampled pressure readings that occurred during the previous day.
Default: -1.00

Item **Item Name & Description**

692 **P1 Previous Day High Pressure**
Recorder's maximum P1 sampled pressure readings that occurred during the previous day.
Default: -1.00

693 **P1 Previous Day Low Pressure**
Recorder's minimum P1 sampled pressure readings that occurred during the previous day.
Default: 99999.99

694 Recorder's average P2 sampled pressure readings that occurred during the previous day.
Default: -1.00

695 **P2 Previous Day High Pressure**
Recorder's maximum P2 sampled pressure readings that occurred during the previous day.
Default: -1.00

696 **P2 Previous Day Low Pressure**
Recorder's minimumP2 sampled pressure readings that occurred during the previous day.
Default: 99999.99

697 **Temperature Previous Day Average**
Recorder's average T1 sampled temperature readings that occurred during the previous day.
Default: -1.00

698 **Temperature Previous Day High**
Recorder's maximum T1 sampled temperature readings that occurred during the previous day.
Default: -1.00

699 **Temperature Previous Day Low**
Recorder's minimum T1 sampled temperature readings that occurred during the previous day.
Default: -1.00

700 **P1 Previous Day High Time**
The time at which the recorder's maximum P1 sampled pressure reading (item 692) occurred during the previous day.
Default: 00 00 00

701 **P1 Previous Day High Date**
The date at which the recorder's maximum P1 sampled pressure reading (item 692) occurred during the previous day.
Default: 01-01-04

Item **Item Name & Description**

702 **P1 Previous Day Low Time**
The time at which the recorder's minimum P1 sampled pressure reading (item 693) occurred during the previous day.
Default: 00 00 00

703 **P1 Previous Day Low Date**
The date at which the recorder's minimum P1 sampled pressure reading (item 693) occurred during the previous day.
Default: 01-01-04

704 **P2 Previous Day High Time**
The time at which the recorder's maximum P2 sampled pressure reading (item 695) occurred during the previous day.
Default: 00 00 00

705 The date at which the recorder's maximum P2 sampled pressure reading (item 695) occurred during the previous day.
Default: 01-01-04

706 **P2 Previous Day Low Time**
The time at which the recorder's minimum P2 sampled pressure reading (item 696) occurred during the previous day.
Default: 00 00 00

707 **P2 Previous Day Low Date**
The date at which the recorder's minimum P2 sampled pressure reading (item 696) occurred during the previous day.
Default: 01-01-04

708 **Temperature Previous Day High Time**
The time at which the recorder's maximum T1 sampled temperature reading (item 698) occurred during the previous day.
Default: 00 00 00

709 **Temperature Previous Day High Date**
The date at which the recorder's maximum T1 sampled temperature reading (item 698) occurred during the previous day.
Default: 01-01-04

710 **Temperature Previous Day Low Time**
The time at which the recorder's minimumT1 sampled temperature reading (item 699) occurred during the previous day.
Default: 00 00 00

711 **Temperature Previous Day Low Date**
The date at which the recorder's minimum T1 sampled temperature reading (item 699) occurred during the previous day.
Default: 00 00 00

Item **Item Name & Description**

769 **RBX Alarm Enable**
When the RBX function (Report By Exception) is disabled, all instrument alarms operate as in previous versions of firmware, i.e., alarms stay active until manually cleared. When RBX is enabled, instrument alarms are automatically cleared after the alarm parameter returns to its normal operating range, buffered by a user- specified dead band.

	Code	Value
Default:	0	Alarm
	1	RBX Enable

770 **P1 Dead Band**
A hysteresis band that provides a buffer below the P1 pressure high limit and above the P1 low-pressure limit and if enabled, alarms are automatically cleared by RBX. The user-specified value determines the magnitude of the band. The P1 pressure measurement must pass completely through the dead band before the pressure alarm is automatically cleared.
Default: 5.00

771 **Temperature Dead Band** 10.0000
A hysteresis band that provides a buffer below the T1 temperature high limit and above the T1 temperature low limit and if enabled, alarms are automatically cleared by RBX. The user-specified value determines the magnitude of the band. The P1 pressure measurement must pass completely through the dead band before the pressure alarm is automatically cleared.
Default: 10.00

772 **Battery Dead Band**
A hysteresis band that provides a buffer below
Default: 1.00

776 When enabled, a CLR ALARM log trigger is written in the Audit Trail at the time the alarm is cleared, either manually or by RBX.

	Code	Value
Default:	0	Inactive
	1	Active

774 **Protocol Code A**
Enables or disables the sending of time-out error (error 21) during a serial link sign-on.

	Code	Value
Default:	0	Send all errors
	1	Time-out error 21 not sent

775 **Timeout Delay 1**
Time in seconds that ERX waits for the host computer to send an ENQ, following an EOT before issuing an error 21.
Default: 25

Item **Item Name & Description**

776 **Timeout Delay 2**
Time in seconds that ERX waits for the host computer to send an ENQ, following an EOT before issuing an error 21.
Default: 25

777 **RBX Alarm Event**
Indication of a RBX alarm activity since the recorder was last interrogated.

779 **Sample Enable**

780 **Modem Initialization String**
Character string used to initialize recorder's modem at the beginning of a call-in.
Default: ATE0Q0V0X4

781 **Modem Dial String**
Character sting used to initial dialing.
Default: ATDT

782 **Modem Hang-up String**
Character string used to disconnect modem communications.
Default: ATH

783 **Call Out Stop Time**
User defined time during the calendar day the modem power control will end.
Default: 23 59 00

784 **Call-in Phone Number 1, IP Address 1**
Phone number or IP Address 1 the recorder will call when the scheduled call-in feature is enabled.

785 **Call-In Phone Number 2, Address 2**
Phone number or IP Address 2 the recorder will call when the scheduled call-in feature is enabled.

786 **Modem Retry Interval A**
The amount of time in minutes to wait before attempting a retry, following a failed scheduled or alarm call-in. Often referred to as the "Primary Retry Interval."
Default: 5

787 **Modem Retry Interval B**
The amount of time in minutes to wait before attempting a retry, following a failed scheduled or alarm call-in. Often referred to as the secondary retry interval.
Default: 1440, minutes

788 **Modem Retry A Count**
Number of times that interval A retries
Default: 3

Item **Item Name & Description**

789 **Modem AT Enable**
Selection to that determines the type of call-in initiated by the recorder.

	Code	Value
	0	Call-in via alarm pulse
Default:	1	Call-in via AT commands

790 Parameter used to set the amount of time to leave the system powered up after a call-in (allowing time for the host to call-back). Time is specified in minutes.
Default: 15 minutes

791 **Call-out Start Time**
Parameter used to set the time of day to start the call-out cycle when using modem power control.
Default: 00 00 00

792 **Call-out Repeat Interval**
Parameter used to set the amount of the time to wait from the beginning of the current interval until repeating the call-out window set by the call-out keep alive time, specified in minutes.
Default: 0 minutes

793 **Call-out Keep Alive Time**
Parameter used to set the time of day to start the call-out cycle when using modem power control.
Default: 0 minutes

807 **P3 High/High Alarm Limit**
The high/high alarm feature adds an additional alarm notice, that is, in addition to the normal high alarm limit set by item 455 and even higher alarm limit may be set, which creates a two-step alarm notification.
Default: 333.00

808 **P3 Low/Low Alarm Limit**
The low/low alarm feature adds an additional alarm notice, that is, in addition to the normal low alarm limit set by item 456 and even lower alarm limit may be set, which creates a two-step alarm notification.
Default: -1.00

809 **P3 High/High Alarm**

	Code	Value
Default:	00000000	No alarm
	11111111	Alarm

810 **P3 Low/Low Alarm**

	Code	Value
Default:	00000000	No alarm
	11111111	Alarm

Item **Item Name & Description**

811 **P2 Dead Band**
A hysteresis band that provides a buffer below the P2 pressure high limit and above the P2 low-pressure limit and is cleared automatically by RBX if the alarm pressure condition no longer exist. The user-specified value determines the magnitude of the band. The P2 pressure measurement must pass completely through the dead band before the pressure alarm is automatically cleared.

Default: 5.00

812 **Default Display**
A user-selectable parameter used to select which item will be displayed on the LCD when the recorder is in the sample mode.

Default: 500

813 The high/high alarm feature adds an additional alarm notice, that is, in addition to the normal high alarm limit set by item 553 and even higher alarm limit may be set, which creates a two-step alarm notification.

Default: 111.00

814 The low/low alarm feature adds an additional alarm notice, that is, in addition to the normal low alarm limit set by item 554 and even lower alarm limit may be set, which creates a two-step alarm notification.

Default: -1.00

815 **P1 High/High Alarm**

	Code	Value
Default:	00000000	No alarm
	11111111	Alarm

816 **P1 Low/Low Alarm**

	Code	Value
Default:	00000000	No alarm
	11111111	Alarm

817 **P2 High/High Alarm Limit**
The high/high alarm feature adds an additional alarm notice, that is, in addition to the normal high alarm limit set by item 555 and even higher alarm limit may be set, which creates a two-step alarm notification.

Default: 222.00

818 **P2 Low/Low Alarm Limit**
The low/low alarm feature adds an additional alarm notice, that is, in addition to the normal low alarm limit set by item 556 and even lower alarm limit may be set, which creates a two-step alarm notification.

Default: -1.00

819 **P2 High/High Alarm**

	Code	Value
Default:	00000000	No alarm
	11111111	Alarm

Item	Item Name & Description

820 **P2 Low/Low Alarm**

	Code	Value
Default:	00000000	No alarm
	11111111	Alarm

821 **Modem Wake-up Delay**

Default: 50, Tenths of second

Parts List

Item	Part Number	Description	9006 PPPT	9007 PPP	9004 NON-UPGRADEABLE PPT	9035 NON-UPGRADEABLE PP	9004 UPGRADEABLE PPT	9005 UPGRADEABLE PP	9000 UPGRADEABLE PT	9001 UPGRADEABLE P
1	20-9534	DRILLING, CASE	1	1	1	1	1	1	1	1
2	20-2191	VENT	2	2	2	2	2	2	2	2
3	20-3737	FILTER	2	2	2	2	2	2	2	2
4	20-8911	FITTING, DOME STRAIN RELIEF	3	3	3	3	3	3	3	3
5	20-8059	STANDOFF, M-F 6-32 x 3/8"	8	8	8	8	8	8	8	8
6	60-4219	SCREW, PN HD 6-32 x 1/4" PHILLPS	4	4	4	4	4	4	3	3
7	20-8981	GASKET, PRESSURE CONNECTOR	3	3	2	2	3	3	3	3
8	60-4320	SCREW, FIL HD 8-32 x 1/2" PHILLPS	12	12	8	8	12	12	12	12
9	20-8159	WASHER, #8 INTERNAL LOCK	6	6	4	4	4	4	2	2
10	40-1428	ASSEMBLY, TRANSDUCER	3	3	2	2	2	2	1	1
11	40-1329	HOLDER, CABLE TIE	2	2	2	2	2	2	2	2
12	20-3827	CABLE TIE	2	2	2	2	2	2	2	2
13	20-7552	PLUG, STRAIN RELIEF 3/8" DIA.	2	3	2	3	2	3	2	3
14	60-1228	SCREW, BD HD 6-32 x 1/2"	2	2	2	2	2	2	2	2
15	60-1604	NUT, HEX 6-32	2	2	2	2	2	2	2	2
16	20-9673	LABEL, CAUTION	1	1	1	1	1	1	1	1
17	20-9054	ASSEMBLY, PRESSURE CONNECTOR	3	3	2	2	2	2	1	1
18	20-4295	LATCH w/ HASP	1	1	1	1	1	1	1	1
19	SEE TABLE	TEMP. SYSTEM	1	0	1	0	1	0	1	0
20	40-3206	PRESSURE EXPANSION BOARD	1	1	1	1	1	1	0	0
21	20-8622	LABEL, P1	1	1	1	1	1	1	1	1
22	20-8623	LABEL, P2	1	1	1	1	1	1	1	1
23	20-9951	LABEL, P3	1	1	0	0	1	1	1	1
24	20-8978	COVER PLATE	0	0	0	0	1	1	2	2
25	60-1605	NUT, HEX 8-32	0	0	0	0	4	4	8	8
26	60-1220	SCREW, FLAT HD 6-32 x 1/4"	2	2	2	2	2	2	2	2
27	20-8704	STANDOFF, M-F 6-32 x 3/4"	2	2	2	2	2	2	0	0
28	40-2112	PRESSURE TERMINATOR	0	0	1	1	1	1	2	2
30	60-2408	SCREW, SET, 10-32 X 1 1/4	1	1	1	1	1	1	1	1
31	20-5300	WASHER, LOCK, #10 EXTERNAL STAR	4	4	4	4	4	4	4	4
47	40-2657	4 POSITION TERMINAL BLOCK	1	1	1	1	1	1	1	1
48	40-3299	ASSY, RIBBON CABLE, 14 PIN	1	1	1	1	1	1	0	0
49	40-3313	ASSY, PRESSURE EXPANSION CABLE	1	1	1	1	1	1	0	0
50	20-9628	CIRCUIT BOARD SUPPORTS	2	2	2	2	2	2	0	0
51	60-1249	SCREW, 6-32 x 5/16 PAN, SELF	2	2	2	2	2	2	0	0
52	40-2572-4T	CIRCUIT BOARD ASSEMBLY	1	1	1	1	1	1	1	1
53	60-1609	NUT, HEX 10-32	4	4	4	4	4	4	4	4

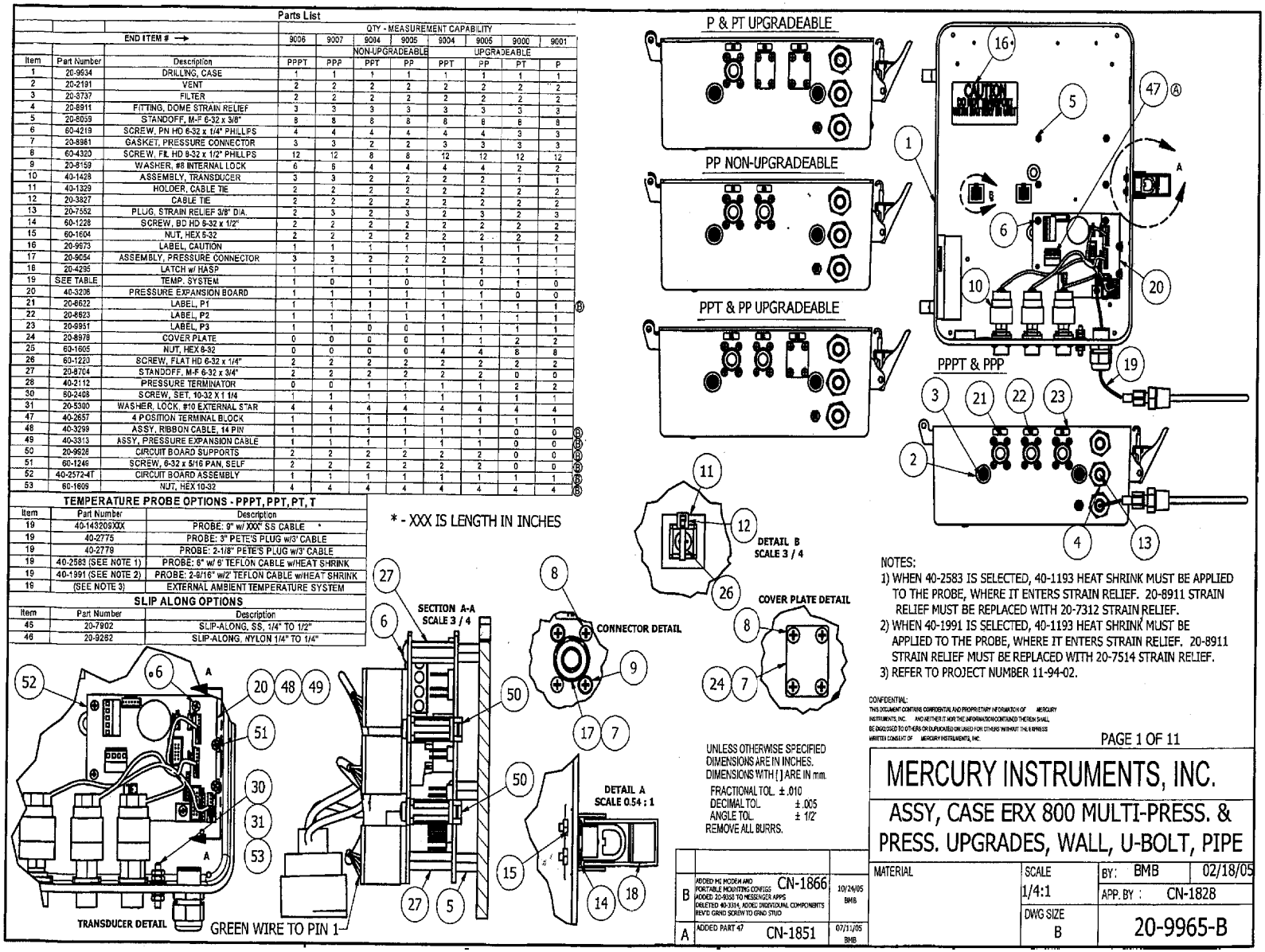
TEMPERATURE PROBE OPTIONS - PPPT, PPT, PT, T

Item	Part Number	Description
19	40-143209XXX	PROBE: 9" w/ XXX" SS CABLE *
19	40-2775	PROBE: 3" PETE'S PLUG w/3' CABLE
19	40-2779	PROBE: 2-1/8" PETE'S PLUG w/3' CABLE
19	40-2583 (SEE NOTE 1)	PROBE: 6" w/ 6' TEFLON CABLE w/HEAT SHRINK
19	40-1991 (SEE NOTE 2)	PROBE: 2-9/16" w/2' TEFLON CABLE w/HEAT SHRINK
19	(SEE NOTE 3)	EXTERNAL AMBIENT TEMPERATURE SYSTEM

SLIP ALONG OPTIONS

Item	Part Number	Description
45	20-7902	SLIP-ALONG, SS, 1/4" TO 1/2"
46	20-9282	SLIP-ALONG, NYLON 1/4" TO 1/4"

* - XXX IS LENGTH IN INCHES



NOTES:
1) WHEN 40-2583 IS SELECTED, 40-1193 HEAT SHRINK MUST BE APPLIED TO THE PROBE, WHERE IT ENTERS STRAIN RELIEF. 20-8911 STRAIN RELIEF MUST BE REPLACED WITH 20-7312 STRAIN RELIEF.
2) WHEN 40-1991 IS SELECTED, 40-1193 HEAT SHRINK MUST BE APPLIED TO THE PROBE, WHERE IT ENTERS STRAIN RELIEF. 20-8911 STRAIN RELIEF MUST BE REPLACED WITH 20-7514 STRAIN RELIEF.
3) REFER TO PROJECT NUMBER 11-94-02.

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UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. DIMENSIONS WITH [ ] ARE IN mm.
FRACTIONAL TOL. ± .010
DECIMAL TOL. ± .005
ANGLE TOL. ± 1/2°
REMOVE ALL BURRS.

B	ADDED HS MODEM AND PORTABLE MOUNTING CONFIGS ADDED 20-9358 TO MESSENGER APPS DELETED 40-3314, ADDED INDIVIDUAL COMPONENTS REV'D GRND SCREW TO GRND STUD	CN-1866	10/24/05 BMB
A	ADDED PART 47	CN-1851	07/11/05 BMB

MERCURY INSTRUMENTS, INC.

ASSY, CASE ERX 800 MULTI-PRESS. & PRESS. UPGRADES, WALL, U-BOLT, PIPE

MATERIAL	SCALE 1/4:1	BY: BMB 02/18/05
	DWG SIZE B	APP. BY : CN-1828
		20-9965-B

Honeywell

Parts List

			QTY - MEASUREMENT CAPABILITY		
		END ITEM # →	9000	9001	9002
			NON UPGRADEABLE		
Item	Part Number	Description	PT	P	T
1	20-9934	DRILLING, CASE	1	1	1
2	20-2191	VENT	2	2	2
3	20-3737	FILTER	2	2	2
4	20-8911	FITTING, DOME STRAIN RELIEF	3	3	3
5	20-8059	STANDOFF, M-F 6-32 x 3/8"	8	8	8
6	60-4219	SCREW, PN HD 6-32 x 1/4" PHILLIPS	4	4	4
7	20-8981	GASKET, PRESSURE CONNECTOR	1	1	0
8	60-4320	SCREW, FIL HD 8-32 x 1/2" PHILLIPS	4	4	0
9	20-8159	WASHER, #8 INTERNAL LOCK	2	2	0
10	40-1428	ASSEMBLY, TRANSDUCER	1	1	0
11	40-1329	HOLDER, CABLE TIE	2	2	2
12	20-3827	CABLE TIE	2	2	2
13	20-7552	PLUG, STRAIN RELIEF 3/8" DIA.	2	3	2
14	60-1228	SCREW, BD HD 6-32 x 1/2"	2	2	2
15	60-1604	NUT, HEX 6-32	2	2	2
16	20-9973	LABEL, CAUTION	1	1	1
17	20-9054	ASSEMBLY, PRESSURE CONNECTOR	1	1	0
18	20-4295	LATCH w/ HASP	1	1	1
19	SEE TABLE	TEMP. SYSTEM	1	0	1
21	20-8622	LABEL, P1	1	1	0
26	60-1220	SCREW, FLAT HD 6-32 x 1/4"	2	2	2
28	40-2572-4	ASSEMBLY, MAIN PC BOARD	1	1	1
30	60-2408	SCREW, SET, 10-32 X 1 1/4	1	1	1
31	20-5300	WASHER, LOCK, #10 EXTERNAL STAR	4	4	4
47	40-2657	4 POSITION TERMINAL BLOCK	1	1	1
53	60-1609	NUT, HEX 10-32	4	4	4

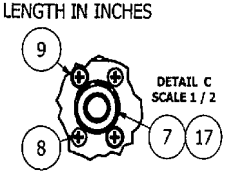
TEMPERATURE PROBE OPTIONS - PT, T

Item	Part Number	Description
19	40-143209XXX	PROBE: 9' w/ XXX' SS CABLE *
19	40-2775	PROBE: 3" PETE'S PLUG w/3' CABLE
19	40-2779	PROBE: 2-1/8" PETE'S PLUG w/3' CABLE
19	40-2583 (SEE NOTE 1)	PROBE: 6" w/ 6' TEFLON CABLE w/HEAT SHRINK
19	40-1991 (SEE NOTE 2)	PROBE: 2-9/16" w/2' TEFLON CABLE w/HEAT SHRINK
19	(SEE NOTE 3)	EXTERNAL AMBIENT TEMPERATURE SYSTEM

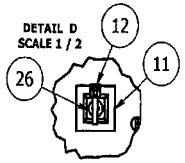
SLIP ALONG OPTIONS

Item	Part Number	Description
46	20-7902	SLIP-ALONG, SS, 1/4" TO 1/2"
46	20-9262	SLIP-ALONG, NYLON 1/4" TO 1/4"

*- XXX IS LENGTH IN INCHES



DETAIL C
SCALE 1 / 2



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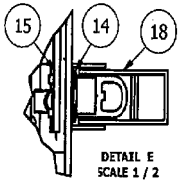

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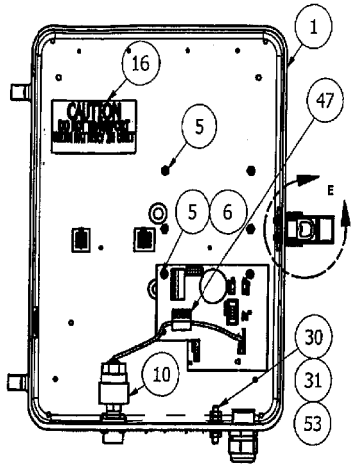
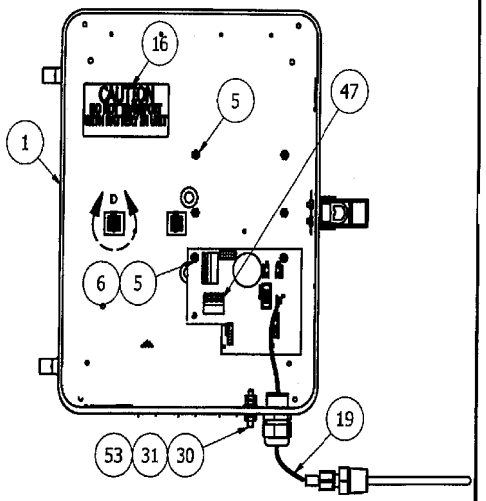
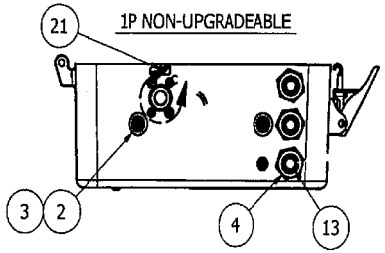




1P NON-UPGRADEABLE



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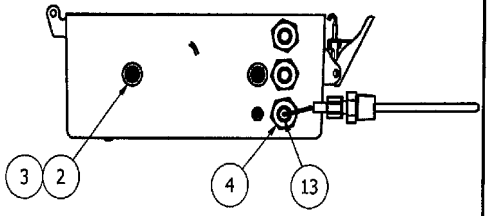

NOTES:

1) WHEN 40-2583 IS SELECTED, 40-1193 HEAT SHRINK MUST BE APPLIED TO THE PROBE, WHERE IT ENTERS STRAIN RELIEF. 20-8911 STRAIN RELIEF MUST BE REPLACED WITH 20-7312 STRAIN RELIEF.
2) WHEN 40-1991 IS SELECTED, 40-1193 HEAT SHRINK MUST BE APPLIED TO THE PROBE, WHERE IT ENTERS THE STRAIN RELIEF. 20-8911 STRAIN RELIEF MUST BE REPLACED WITH 20-7514 STRAIN RELIEF.
3) REFER TO PROJECT NUMBER 11-94-02.

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DIMENSIONS WITH [ ] ARE IN mm.
FRACTIONAL TOL. ±.010
DECIMAL TOL. ±.005
ANGLE TOL. ± 1/2°
REMOVE ALL BURRS.

B	ADDED MI MODEM AND PORTABLE MOUNTING CONFIGS ADDED 20-9368 TO MESSENGER APPS DELETED 40-3314, ADDED INDIVIDUAL COMPONENTS REVD GRND SCREW TO GRND STUD CN-1866	10/24/05 BMB
A	ADDED PART #47 CN-1851	07/11/05 BMB

MERCURY INSTRUMENTS, INC.

ASSY, CASE ERX 800 SINGLE PRESS. - NON-UPGRADES, WALL, U-BOLT, PIPE

MATERIAL	SCALE	BY: BMB	02/18/05
	1/4:1	APP. BY : CN-1828	
	DWG SIZE B	20-9965-B	

Wall Mount Parts List

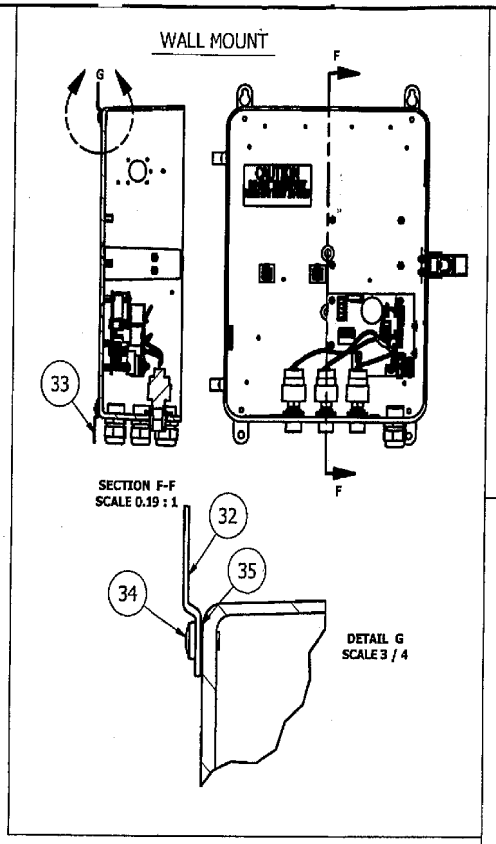
Item	Part Number	Description	QTY
32	20-1586	HANGER, TOP	2
33	20-1587	HANGER, BOTTOM	2
34	60-1353	SCREW, BD HD 10-32 x 5/16"	4
35	20-5300	WASHER, #10 EXTERNAL LOCK	4

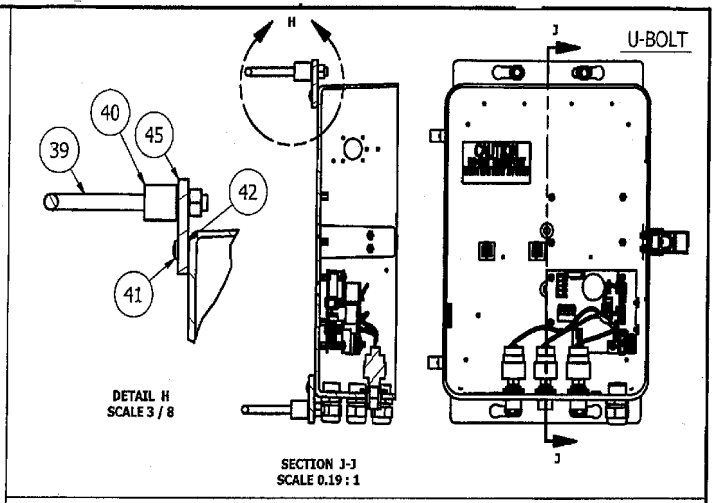
Pipestand Parts List

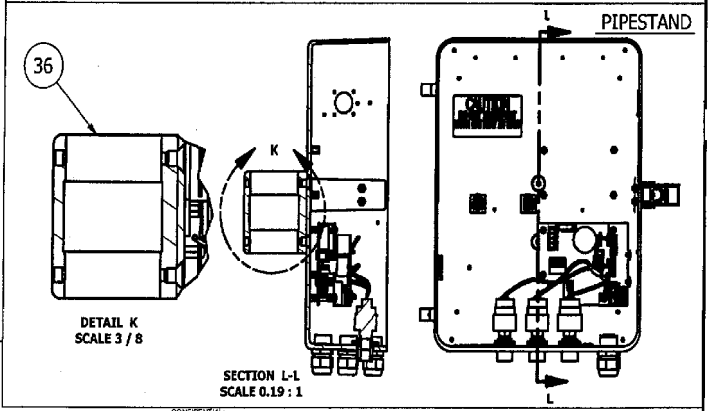
Item	Part Number	Description	QTY
36	20-6892	BRACKET, PIPE MOUNTING	1
37	60-1458	SCREW, 5/16-18 x 1/2" FLAT HD	2
38	60-2501	SCREW, SET 5/16-18 x 5/16"	2

U-Bolt Parts List

Item	Part Number	Description	QTY
	2" U-BOLT		
39	20-6724	U-BOLT, 2"	2
40	20-6726	COLLAR, U-BOLT, 2"	4
41	60-1356	SCREW, BD HD 10-32 x 1/2"	4
42	20-5300	WASHER, #10 EXTERNAL LOCK	4
43	20-4266	NUT, HEX 3/8-16	4
44	20-6731	WASHER, LOCK 3/8"	4
45	20-6719	BRACKET, U-BOLT	1
	3" U-BOLT		
39	20-4535	U-BOLT, 3"	2
40	20-6727	COLLAR, U-BOLT, 3"	4
41	60-1356	SCREW, BD HD 10-32 x 1/2"	4
42	20-5300	WASHER, #10 EXTERNAL LOCK	4
43	20-4266	NUT, HEX 3/8-16	4
44	20-6731	WASHER, LOCK 3/8"	4
45	20-6719	BRACKET, U-BOLT	1
	4" U-BOLT		
39	20-2475	U-BOLT, 4" w/NUTS	2
40	20-6728	COLLAR, U-BOLT, 4"	4
41	60-1356	SCREW, BD HD 10-32 x 1/2"	4
42	20-5300	WASHER, #10 EXTERNAL LOCK	4
44	20-6732	WASHER, LOCK 1/2"	4
45	20-6719	BRACKET, U-BOLT	2







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DIMENSIONS WITH [ ] ARE IN mm.
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DECIMAL TOL. ±.005
ANGLE TOL. ± 1/2°
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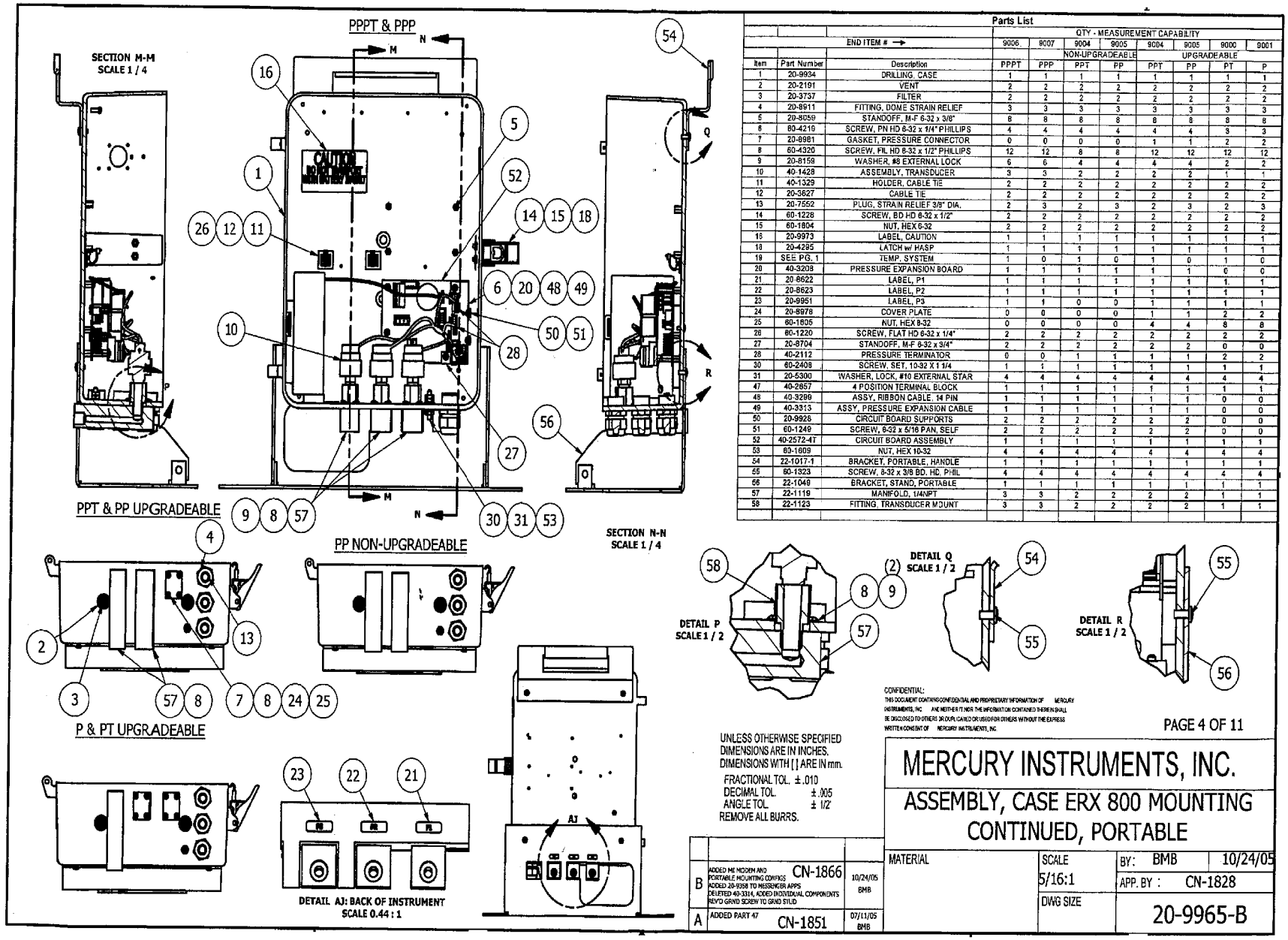
B	ADDED MC MODEM AND PORTABLE MOUNTING CONFIGS CN-1866 ADDED 20-9358 TO MESSENGER APPS DELETED 40-3314, ADDED INDIVIDUAL COMPONENTS REV'D GRND SCREW TO GRND STUD	10/24/05 BMB
A	ADDED PART 47 CN-1851	07/11/05 BMB

MERCURY INSTRUMENTS, INC.

ASSEMBLY, CASE ERX 800 MOUNTING, WALL, U-BOLT, PIPESTAND

MATERIAL	SCALE	BY: BMB	02/18/05
	3/16:1	APP. BY : CN-1828	
	DWG SIZE B	20-9965-B	

Honeywell



Parts List

			QTY - MEASUREMENT CAPABILITY							
		END ITEM # →	9006	9007	9004	9005	9004	9005	9000	9001
					NON-UPGRADEABLE		UPGRADEABLE			
Item	Part Number	Description	PPPT	PPP	PPT	PP	PPT	PP	PT	P
1	20-9934	DRILLING, CASE	1	1	1	1	1	1	1	1
2	20-2191	VENT	2	2	2	2	2	2	2	2
3	20-3737	FILTER	2	2	2	2	2	2	2	2
4	20-8911	FITTING, DOME STRAIN RELIEF	3	3	3	3	3	3	3	3
5	20-8059	STANDOFF, M-F 6-32 x 3/8"	8	8	8	8	8	8	8	8
6	80-4219	SCREW, PN HD 6-32 x 1/4" PHILLIPS	4	4	4	4	4	4	3	3
7	20-8981	GASKET, PRESSURE CONNECTOR	0	0	0	0	1	1	2	2
8	60-4320	SCREW, FIL HD 8-32 x 1/2" PHILLIPS	12	12	8	8	12	12	12	12
9	20-8159	WASHER, #8 EXTERNAL LOCK	6	6	4	4	4	4	2	2
10	40-1428	ASSEMBLY, TRANSDUCER	3	3	2	2	2	2	1	1
11	40-1329	HOLDER, CABLE TIE	2	2	2	2	2	2	2	2
12	20-3627	CABLE TIE	2	2	2	2	2	2	2	2
13	20-7552	PLUG, STRAIN RELIEF 3/8" DIA.	2	3	2	3	2	3	2	3
14	60-1228	SCREW, BD HD 6-32 x 1/2"	2	2	2	2	2	2	2	2
15	60-1804	NUT, HEX 6-32	2	2	2	2	2	2	2	2
16	20-9973	LABEL, CAUTION	1	1	1	1	1	1	1	1
18	20-4295	LATCH w/ HASP	1	1	1	1	1	1	1	1
19	SEE PG. 1	TEMP. SYSTEM	1	0	1	0	1	0	1	0
20	40-3208	PRESSURE EXPANSION BOARD	1	1	1	1	1	1	0	0
21	20-8622	LABEL, P1	1	1	1	1	1	1	1	1
22	20-8623	LABEL, P2	1	1	1	1	1	1	1	1
23	20-9951	LABEL, P3	1	1	0	0	1	1	1	1
24	20-8978	COVER PLATE	0	0	0	0	1	1	2	2
25	60-1605	NUT, HEX 8-32	0	0	0	0	4	4	8	8
26	80-1220	SCREW, FLAT HD 6-32 x 1/4"	2	2	2	2	2	2	2	2
27	20-8704	STANDOFF, M-F 8-32 x 3/4"	2	2	2	2	2	2	0	0
28	40-2112	PRESSURE TERMINATOR	0	0	1	1	1	1	2	2
30	60-2408	SCREW, SET, 10-32 X 1 1/4	1	1	1	1	1	1	1	1
31	20-5300	WASHER, LOCK, #10 EXTERNAL STAR	4	4	4	4	4	4	4	4
47	40-2857	4 POSITION TERMINAL BLOCK	1	1	1	1	1	1	1	1
48	40-3286	ASSY, RIBBON CABLE, 14 PIN	1	1	1	1	1	1	0	0
49	40-3313	ASSY, PRESSURE EXPANSION CABLE	1	1	1	1	1	1	0	0
50	20-9926	CIRCUIT BOARD SUPPORTS	2	2	2	2	2	2	0	0
51	60-1249	SCREW, 6-32 x 5/16 PAN, SELF	2	2	2	2	2	2	0	0
52	40-2572-47	CIRCUIT BOARD ASSEMBLY	1	1	1	1	1	1	1	1
53	60-1609	NUT, HEX 10-32	4	4	4	4	4	4	4	4
54	22-1017-1	BRACKET, PORTABLE, HANDLE	1	1	1	1	1	1	1	1
55	60-1323	SCREW, 8-32 x 3/8 BD. HD. PHIL	4	4	4	4	4	4	4	4
56	22-1049	BRACKET, STAND, PORTABLE	1	1	1	1	1	1	1	1
57	22-1119	MANIFOLD, 1/4NPT	3	3	2	2	2	2	1	1
58	22-1123	FITTING, TRANSDUCER MOUNT	3	3	2	2	2	2	1	1

UNLESS OTHERWISE SPECIFIED
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DIMENSIONS WITH [ ] ARE IN mm.
FRACTIONAL TOL. ±.010
DECIMAL TOL. ±.005
ANGLE TOL. ± 1/2°
REMOVE ALL BURRS.

B	ADDED ME MODEM AND PORTABLE MOUNTING CONFIGS ADDED 20-9358 TO MESSENGER APPS DELETED 40-3314, ADDED INDIVIDUAL COMPONENTS REVD GRND SCREW TO GRND STUD — CN-1866	10/24/05	BMB
A	ADDED PART 47 — CN-1851	07/11/05	BMB

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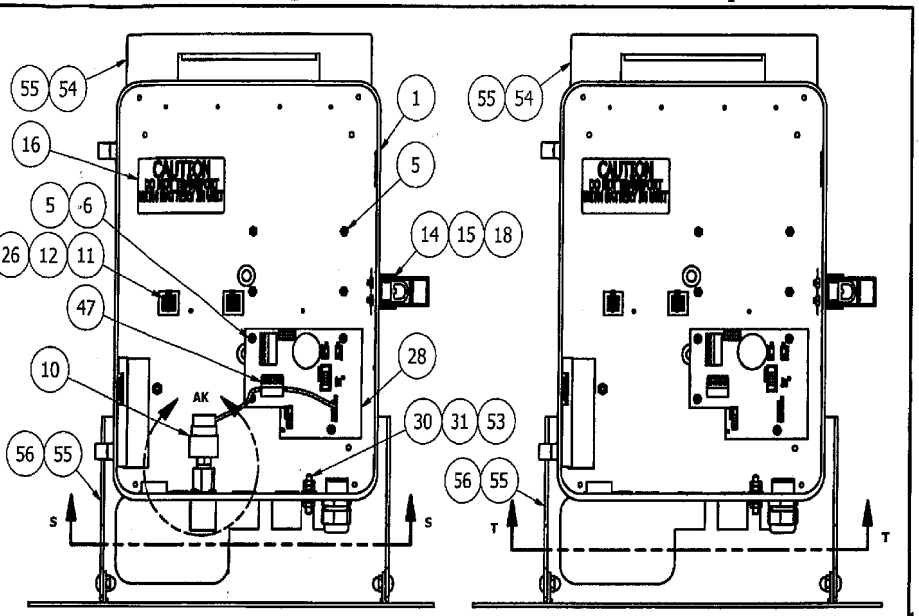
MERCURY INSTRUMENTS, INC.

ASSEMBLY, CASE ERX 800 MOUNTING CONTINUED, PORTABLE

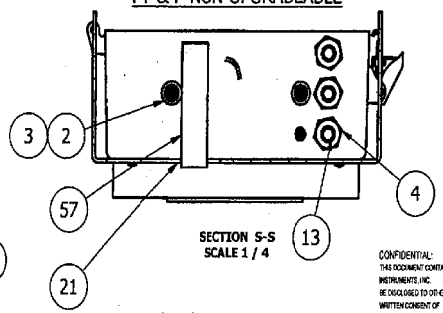
MATERIAL	SCALE 5/16:1	BY: BMB	10/24/05
	DWG SIZE	APP. BY : CN-1828	
		20-9965-B	

Parts List

			QTY - MEASUREMENT CAPABILITY		
END ITEM # →			9000	9001	9002
			NON UPGRADEABLE		
Item	Part Number	Description	PT	P	T
1	20-9934	DRILLING, CASE	1	1	1
2	20-2191	VENT	2	2	2
3	20-3737	FILTER	2	2	2
4	20-8911	FITTING, DOME STRAIN RELIEF	3	3	3
5	20-8059	STANDOFF, M-F 6-32 x 3/8"	8	8	8
6	60-4219	SCREW, PN HD 6-32 x 1/4" PHILLIPS	4	4	4
8	60-4320	SCREW, FIL HD 8-32 x 1/2" PHILLIPS	4	4	0
9	20-8159	WASHER, #8 INTERNAL LOCK	2	2	0
10	40-1428	ASSEMBLY, TRANSDUCER	1	1	0
11	40-1329	HOLDER, CABLE TIE	2	2	2
12	20-3827	CABLE TIE	2	2	2
13	20-7552	PLUG, STRAIN RELIEF 3/8" DIA.	2	3	2
14	60-1228	SCREW, BD HD 6-32 x 1/2"	2	2	2
15	60-1604	NUT, HEX 6-32	2	2	2
16	20-9973	LABEL, CAUTION	1	1	1
18	20-4295	LATCH w/ HASP	1	1	1
19	SEE PAGE 1	TEMP. SYSTEM	1	0	1
21	20-8622	LABEL, P1	1	1	0
26	60-1220	SCREW, FLAT HD 6-32 x 1/4"	2	2	2
28	40-2572-4	ASSEMBLY, MAIN PC BOARD	1	1	1
30	60-2408	SCREW, SET, 10-32 X 1 1/4	1	1	1
31	20-5300	WASHER, LOCK, #10 EXTERNAL STAR	4	4	4
47	40-2657	4 POSITION TERMINAL BLOCK	1	1	1
53	60-1609	NUT, HEX 10-32	4	4	4
54	22-1017-1	BRACKET, PORTABLE, HANDLE	1	1	1
55	60-1323	SCREW, 8-32 x 3/8 BD HD, PHILLIPS	4	4	4
56	22-1049	BRACKET, STAND, PORTABLE	1	1	1
57	22-1119	MANIFOLD, 1/4NPT	1	1	0
58	22-1123	FITTING, TRANSDUCER MOUNT	1	1	0

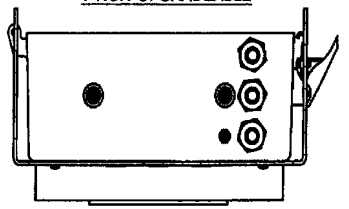


PT & P NON-UPGRADEABLE

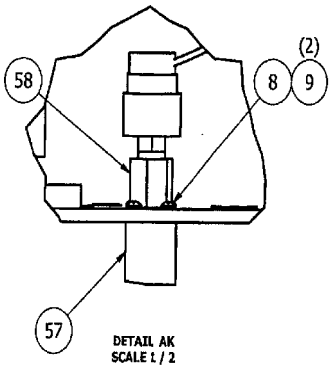


SECTION S-S
SCALE 1 / 4

T NON-UPGRADEABLE



SECTION T-T
SCALE 1 / 4



DETAIL AK
SCALE 1 / 2

SEE PAGE 4

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ANGLE TOL. ± 1/2°
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B	ADDED MI MODEM AND PORTABLE MOUNTING CONFIGS ADDED 20-9358 TO MESSENGER APPS DELETED 40-3314, ADDED INDIVIDUAL COMPONENTS REVD GRND SCREW TO GRND STUD — CN-1866	10/24/05	BMB
A	ADDED PART 47 — CN-1851	07/11/05	BMB

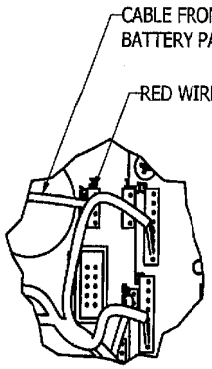
MERCURY INSTRUMENTS, INC.

ASSEMBLY, CASE ERX 800 SINGLE PRESS. - NON-UPGRADEABLE, PORTABLE MOUNT

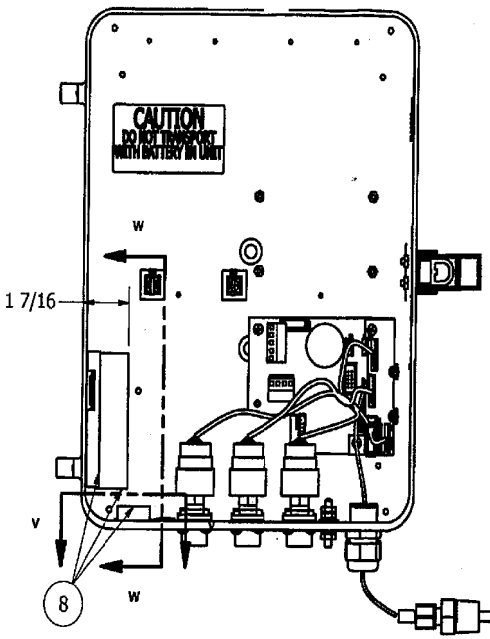
MATERIAL	SCALE 1/4:1	BY: BMB	11/05/05
		APP. BY : CN-1828	
	DWG SIZE B	20-9965-B	

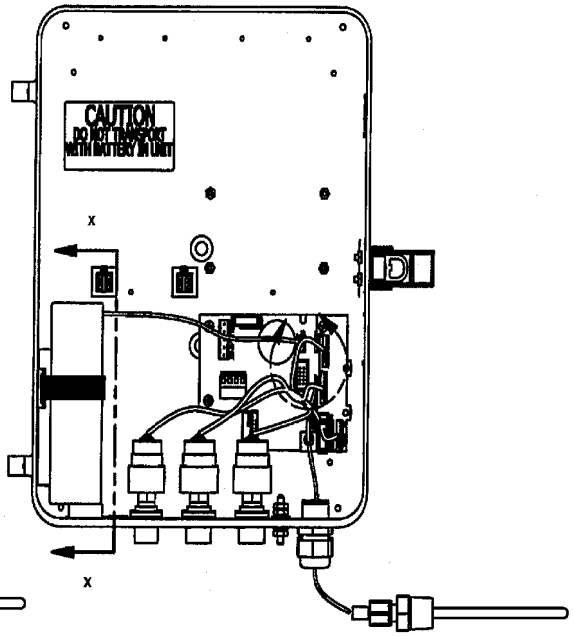
Honeywell

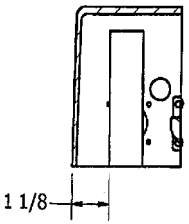
SINGLE BATTERY PACK			
BATTERY PACK OPTIONS			
Item	Part Number	Description	Qty.
1	40-2500	DISPOSABLE BATTERY PACK	1
1	40-2595	ALKALINE RECEPTACLE	1
BATTERY PACK MOUNTING			
Item	Part Number	Description	Qty.
2	60-1202	SCREW, 6-32 x 3/16 BD HD SLOTTED	2
3	20-9396	STRAP BATTERY	1
4	60-1217	SCREW, 6-32 x 3/8 BD. HD SLOTTED	1
5	20-1783	#6 FLAT WASHER	1
6	60-1604	NUT, #6	1
7	20-8689	PLATE, BENT STRIKE	1
8	20-9417	PAD, FOUR SECTION	3



DETAIL U
SCALE 3 / 4

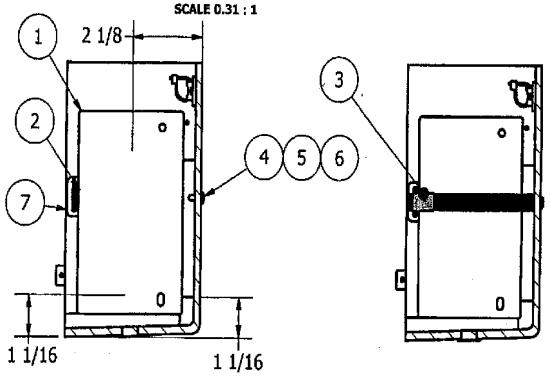






SECTION V-V
SCALE 0.31 : 1

SECTION W-W
SCALE 0.31 : 1



SECTION X-X
SCALE 0.31 : 1

NOTES:
1. VIEWS ARE SHOWN FOR WALL, U-BOLT, AND PIPESTAND MOUNT BUT ARE COMMON TO THE PORTABLE MOUNT.

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DIMENSIONS WITH [ ] ARE IN mm.
FRACTIONAL TOL. ± .010
DECIMAL TOL. ± .005
ANGLE TOL. ± 1/2°
REMOVE ALL BURRS.

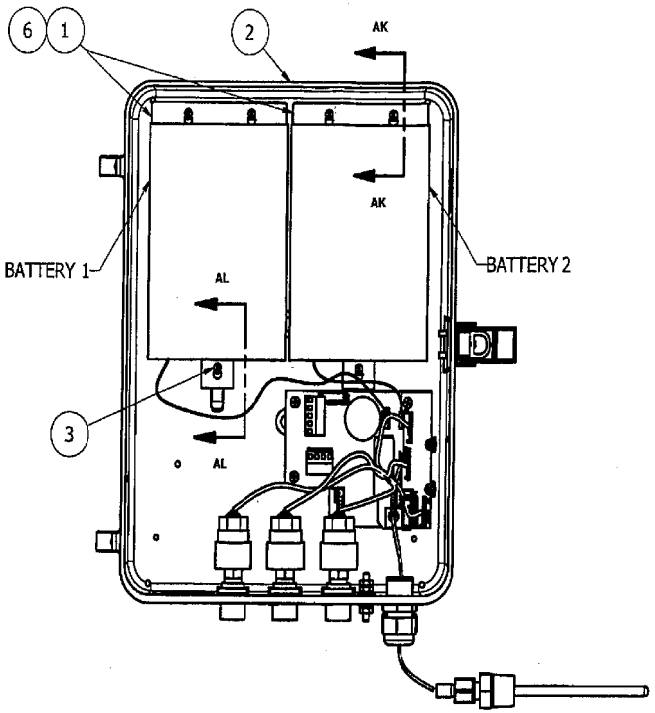
B	ADDED MI MODEM AND PORTABLE MOUNTING CONFIGS ADDED 20-9358 TO MESSENGER APPS DELETED 40-3314, ADDED INDIVIDUAL COMPONENTS REV'D GRND SCREW TO GRND STUD CN-1866	10/24/05 BMB
A	ADDED PART 47 CN-1851	07/11/05 BMB

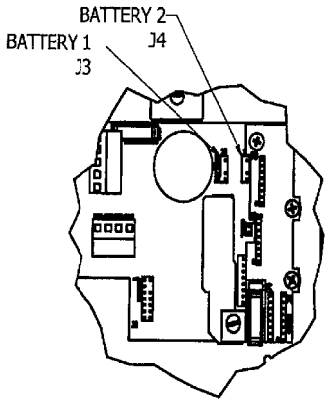
MERCURY INSTRUMENTS, INC.

ASSEMBLY, CASE ERX 800 SINGLE BATTERY OPTIONS

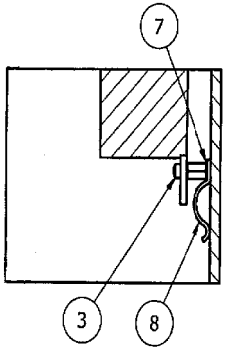
MATERIAL	SCALE 1/4:1	BY: BMB 03/04/05
		APP. BY : CN-1828
	DWG SIZE B	20-9965-B

DUAL BATTERY PACK			
BATTERY PACK OPTIONS			
Item	Part Number	Description	Qty.
1	40-2595	ALKALINE RECEPTACLE	1
BATTERY PACK MOUNTING			
Item	Part Number	Description	Qty.
2	20-9934-1	DRILLING, CASE, DUAL PACKS, MI MODEM	6
3	60-1210	SCREW, 6-32 x 3/8 FILL HD SLOTTED	6
4	20-8059	STANDOFF, 6-32 x 3/8 M/F	6
5	60-1604	NUT, 6-32	5
6	20-9895	COVER, BATTERY PACK	2
7	20-1783	WASHER	1
8	20-8314	CLIP, SPRING	1

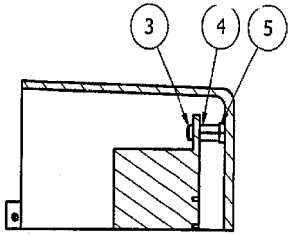




DETAIL AP
SCALE 1 / 2



SECTION AL-AL
SCALE 1 / 2



SECTION AK-AK
SCALE 1 / 2

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B	ADDED MI MODEM AND PORTABLE MOUNTING CONFIGS. ADDED 20-9358 TO MESSENGER APPS. DELETED 40-3314, ADDED INDIVIDUAL COMPONENTS. REV'D GRND SCREW TO GRND STUD. CN-1866	10/24/05	BMB
A	ADDED PART 47 CN-1851	07/11/05	BMB

MERCURY INSTRUMENTS, INC.

ASSEMBLY, CASE ERX 800, DUAL BATTERY OPTIONS

MATERIAL	SCALE	BY: BMB	12/06/05
	5/16:1	APP. BY : CN-1828	
	DWG SIZE B	20-9965-B	

Honeywell

RS-232 OPTIONS

EXTERNAL

Item	Part Number	Description	Qty.
1	60-4219	SCREW, PAN HD 6-32 x 1/4" PHILLIPS	5
2	20-8196	GASKET, AUDIT TRAIL	1
3	40-2717-6	ASSEMBLY, SERIAL I/O w/AUDIT TRAIL	1
4	20-3827	CABLE TIE SEE NOTE 1	1
5	20-8087	LABEL, WARNING DCU	1
6	60-1202	SCREW, BD HD 6-32 x 3/16"	1
7	20-8826	STANDOFF, 1/4 M-F	1
8	20-7284	STANDOFF, 7/16 M-F	1

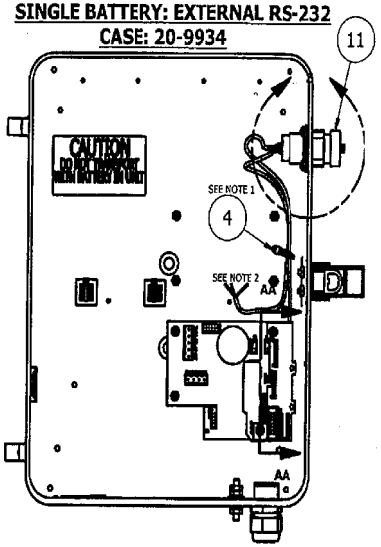
INTERNAL

Item	Part Number	Description	Qty.
1	60-4219	SCREW, PAN HD 6-32 x 1/4" PHILLIPS	4
3	40-2717-6	ASSEMBLY, SERIAL I/O w/AUDIT TRAIL	1
4	20-3827	CABLE TIE SEE NOTE 1	1
5	20-8087	LABEL, WARNING DCU	1
6	60-1202	SCREW, BD HD 6-32 x 3/16"	1
7	20-8826	STANDOFF, 1/4 M-F	1
8	20-7284	STANDOFF, 7/16 M-F	1
9	20-8625	BRACKET, INT. I/O MOUNTING	1
10	60-1302	SCREW, BD HD 6-32 x 5/16"	2

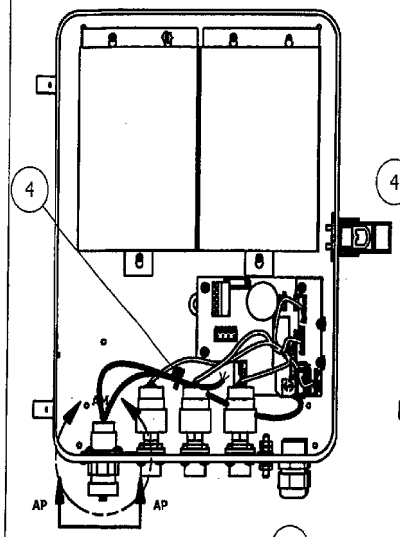
OPTIONAL RS-232 CAP

Item	Part Number	Description	Qty.
11	40-2918	ASSEMBLY, SHORTING PLUG	1
11	40-1576	DUST CAP AND CHAIN	1

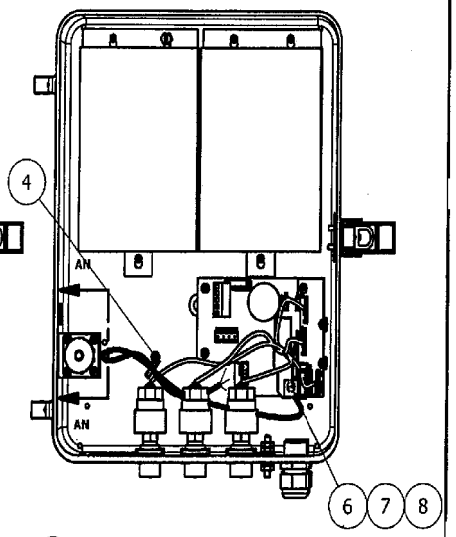
SINGLE BATTERY: EXTERNAL RS-232
CASE: 20-9934



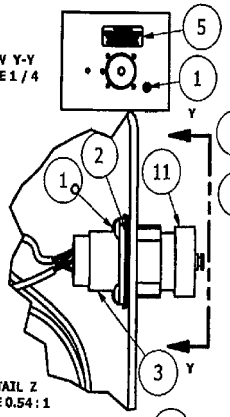
DUAL BATTERY: EXTERNAL RS-232
CASE: 20-9934-1



DUAL BATTERY: INTERNAL RS-232
CASE: 20-9934-1

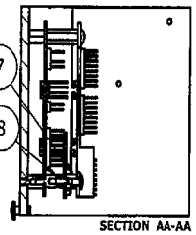


VIEW Y-Y
SCALE 1 / 4



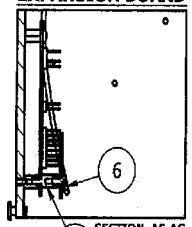
DETAIL Z
SCALE 0.54 : 1

RS-232 W/
EXPANSION BOARD

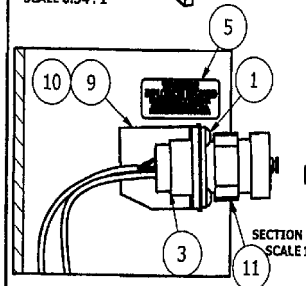


SECTION AA-AA
SCALE 0.40 : 1

RS-232 NO
EXPANSION BOARD

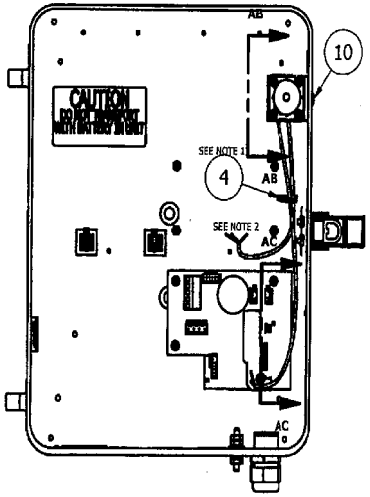


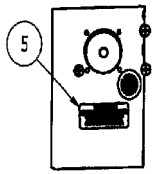
SECTION AC-AC
SCALE 0.40 : 1



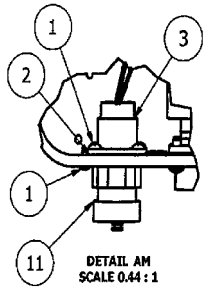
SECTION AB-AB
SCALE 1 / 2

SINGLE BATTERY: INTERNAL RS-232
CASE: 20-9934

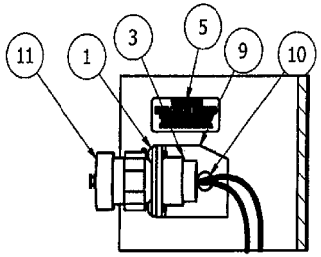




SECTION AP-AP
SCALE 0.31 : 1



DETAIL AM
SCALE 0.44 : 1



SECTION AN-AN
SCALE 0.44 : 1

NOTES:
1) WHEN OPTIONAL BOARD IS USED WITH RS-232 OMIT 20-3827 FROM PARTS LIST.
2) BARE WIRE ENDS MUST BE INSULATED WITH CLEAR HEAT SHRINK, PART NUMBER 40-2359.

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DECIMAL TOL. ±.005
ANGLE TOL. ± 1/2°
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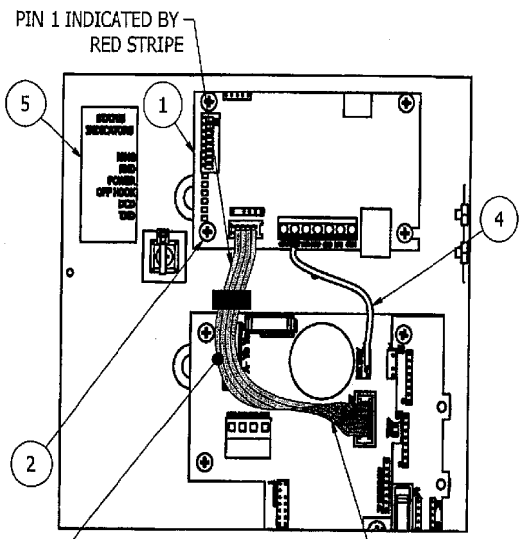
B	ADDED MJ MODEM AND PORTABLE MOUNTING CONFIGS ADDED 20-9358 TO MESSENGER APPS DELETED 40-3314, ADDED INDIVIDUAL COMPONENTS REV'D GRND SCREW TO GRND STUD CN-1866	10/24/05	BMB
A	ADDED PART 47 CN-1851	07/11/05	BMB

MERCURY INSTRUMENTS, INC.

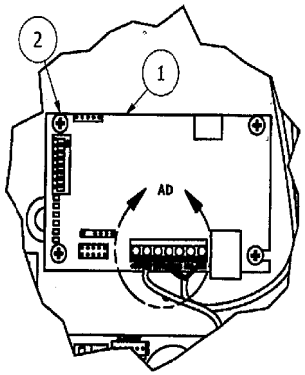
ASSEMBLY, CASE ERX 800 SINGLE AND DUAL BATTERY RS-232

MATERIAL	SCALE 1/4:1	BY: BMB	03/22/05
		APP. BY : CN-1828	
	DWG SIZE B	20-9965-B	

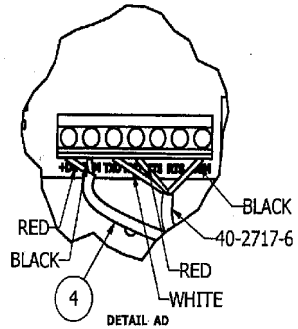


DETAIL: MESSENGER MODEM
NO RS-232

PIN 1 INDICATED BY
RED STRIPE



DETAIL: MESSENGER MODEM
WITH RS-232



DETAIL AD
SCALE 1.08 : 1

OPTIONAL BOARDS			
MESSENGER MODEM w/O RS-232			
Item	Part Number	Description	Qty.
1	40-3000	ASSEMBLY, MESSENGER MODEM	1
2	60-4219	SCREW, PAN HD 6-32 x 1/4 PHILLIPS	4
3	40-2739	ASSEMBLY, 10 POSITION RIBBON	1
4	40-2820-5	CABLE, MODEM POWER	1
5	20-9353	LABEL, STATUS INDICATORS	1
MESSENGER MODEM w/ RS-232			
Item	Part Number	Description	Qty.
1	40-3000	ASSEMBLY, MESSENGER MODEM	1
2	60-4219	SCREW, PAN HD 6-32 x 1/4 PHILLIPS	4
4	40-2820-5	CABLE, MODEM POWER	1
5	20-9358	LABEL, STATUS INDICATORS	1

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DECIMAL TOL. ± .005
ANGLE TOL ± 1/2°
REMOVE ALL BURRS.

B	ADDED M1 MODEM AND PORTABLE MOUNTING CONTROS ADDED 20-9358 TO MESSENGER APPS DELETED 40-3314, ADDED INDIVIDUAL COMPONENTS REV'D GRND SCREW TO GRND STUD CN-1866	10/24/05	BMB
A	ADDED PART 47 CN-1851	07/11/05	BMB

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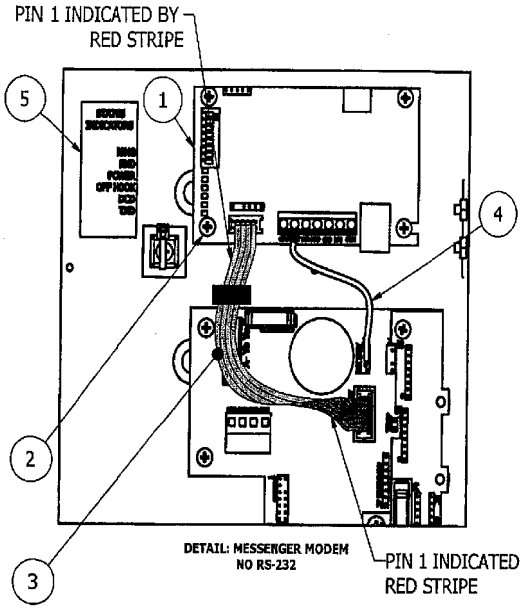
MERCURY INSTRUMENTS, INC.

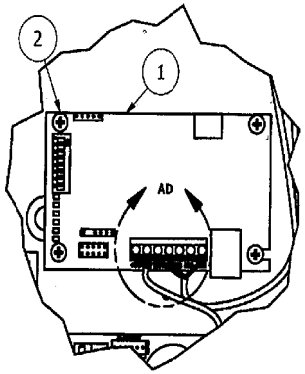
ASSEMBLY, CASE ERX 800, BOARD OPTIONS, SINGLE BATTERY PACK

MATERIAL	SCALE	BY: BMB	03/22/05
	1/4:1	APP. BY : CN-1828	
	DWG SIZE B	20-9965-B	

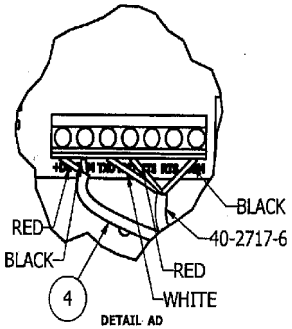
Honeywell



DETAIL: MESSENGER MODEM
NO RS-232



DETAIL: MESSENGER MODEM
WITH RS-232



DETAIL AD
SCALE 1.08 : 1

OPTIONAL BOARDS			
MESSENGER MODEM w/O RS-232			
Item	Part Number	Description	Qty.
1	40-3000	ASSEMBLY, MESSENGER MODEM	1
2	60-4219	SCREW, PAN HD 6-32 x 1/4 PHILLIPS	4
3	40-2739	ASSEMBLY, 10 POSITION RIBBON	1
4	40-2820-5	CABLE, MODEM POWER	1
5	20-9358	LABEL, STATUS INDICATORS	1
MESSENGER MODEM w/ RS-232			
Item	Part Number	Description	Qty.
1	40-3000	ASSEMBLY, MESSENGER MODEM	1
2	60-4219	SCREW, PAN HD 6-32 x 1/4 PHILLIPS	4
4	40-2820-5	CABLE, MODEM POWER	1
5	20-9358	LABEL, STATUS INDICATORS	1

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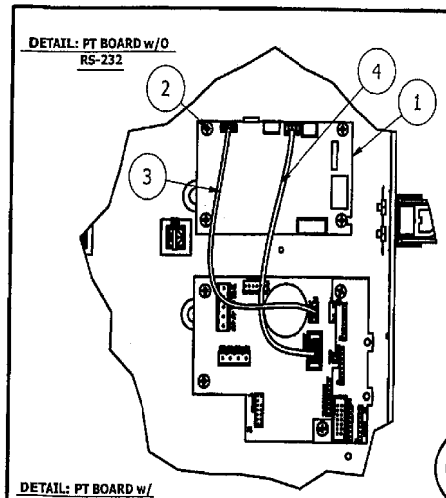
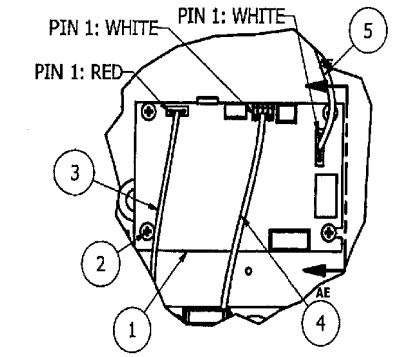
A	ADDED PART 47 CN-1851	07/11/05	BMB

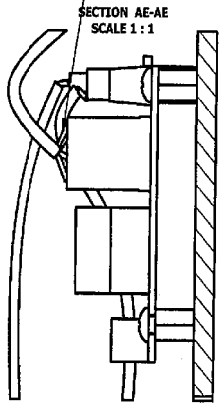
MERCURY INSTRUMENTS, INC.

ASSEMBLY, CASE ERX 800, BOARD OPTIONS, SINGLE BATTERY PACK

MATERIAL	SCALE 1/4:1	BY: BMB 03/22/05
		APP. BY : CN-1828
	DWG SIZE B	20-9965-B

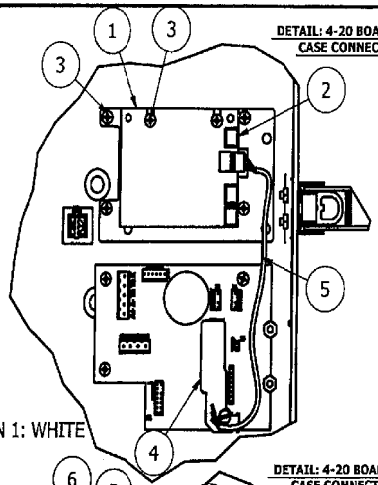


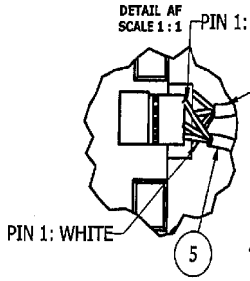


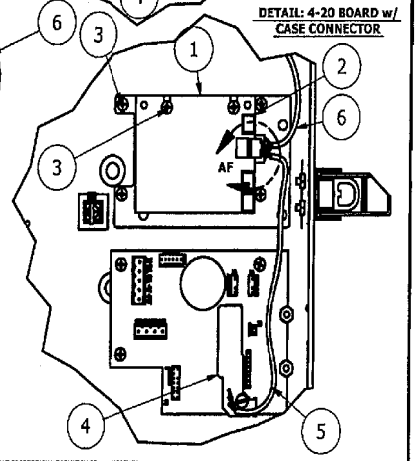


4-20 BOARD w/O CASE CONNECTOR			
Item	Part Number	Description	Qty.
1	40-2500	ASSEMBLY, 4-20 BOARD	1
2	20-9359	ASSEMBLY, MOUNTING PLATE	1
3	60-4219	SCREW, PAN HD 6-32 x 1/4 PHILLIPS	6
4	40-2717-2	SERIAL I/O BOARD	1
5	40-2724	ASSEMBLY, SERIAL CABLE, 4 PIN TO BLOCK	1

4-20 BOARD w/ CASE CONNECTOR			
Item	Part Number	Description	Qty.
1	40-2500	ASSEMBLY, 4-20 BOARD	1
2	20-9359	ASSEMBLY, MOUNTING PLATE	1
3	60-4219	SCREW, PAN HD 6-32 x 1/4 PHILLIPS	6
4	40-2717-2	SERIAL I/O BOARD	1
5	40-2724	ASSEMBLY, SERIAL CABLE, 4 PIN TO BLOCK	1
6	40-1728	ASSEMBLY, RS-232	1







NOTES:
1. REFER TO PAGE 8 FOR ALL RS-232 AND CASE CONNECTOR HARDWARE.

PT BOARD w/O CASE CONNECTOR			
Item	Part Number	Description	Qty.
1	40-2655	ASSEMBLY, PT BOARD	1
2	60-4219	SCREW, PAN HD 6-32 x 1/4 PHILLIPS	4
3	40-2787	ASSEMBLY, POWER CABLE 4 PIN	1
4	40-2790	ASSEMBLY, SERIAL CABLE	1

PT BOARD w/ CASE CONNECTOR			
Item	Part Number	Description	Qty.
1	40-2655	ASSEMBLY, PT BOARD	1
2	60-4219	SCREW, PAN HD 6-32 x 1/4 PHILLIPS	4
3	40-2787	ASSEMBLY, POWER CABLE 4 PIN	1
4	40-2790	ASSEMBLY, SERIAL ASSEMBLY	1
5	40-1728	ASSEMBLY, RS-232	1

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ANGLE TOL. ± 1/2°
REMOVE ALL BURRS.

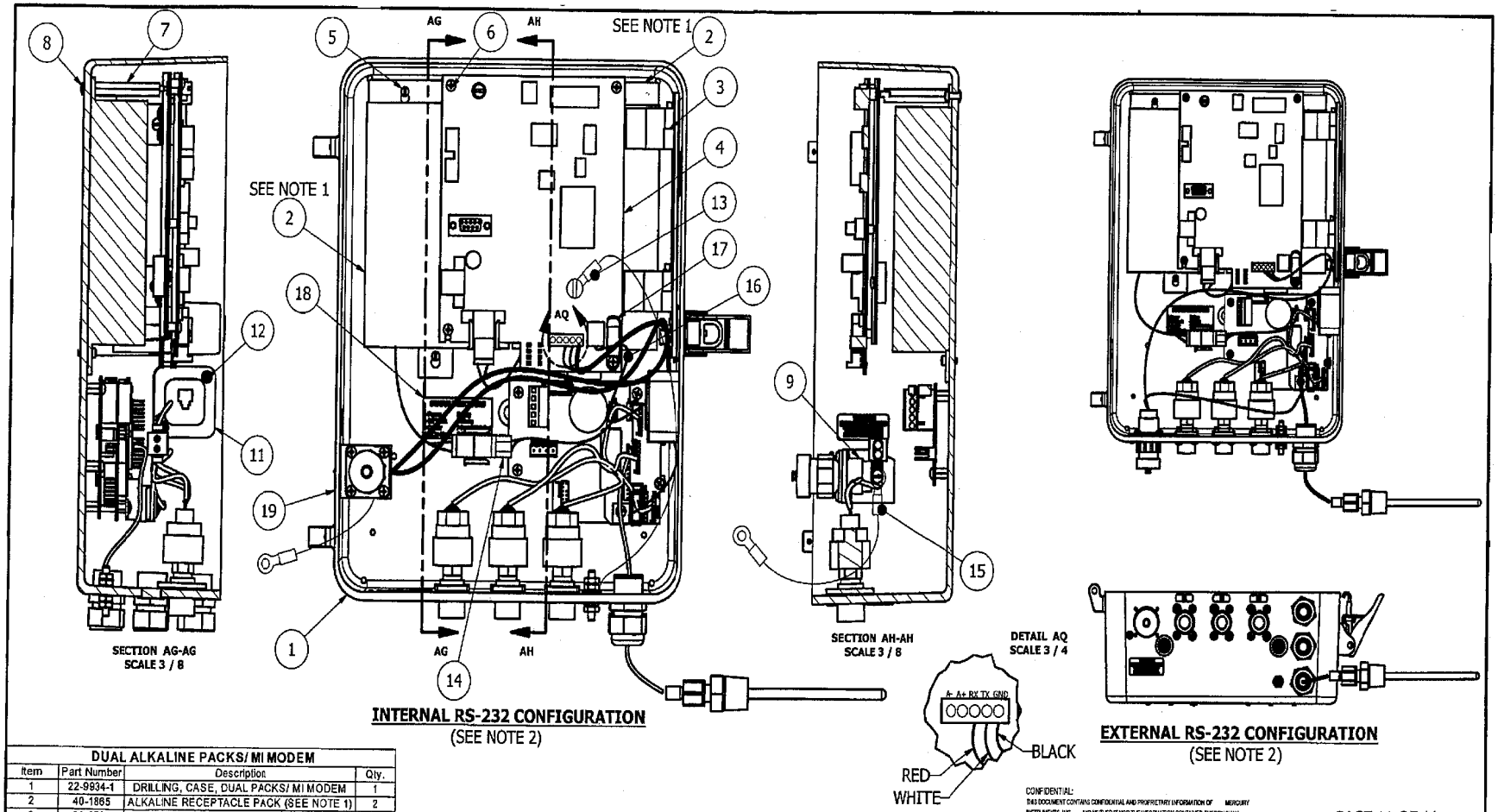
B	ADDED MI MODEM AND PORTABLE MOUNTING CONFIGS ADDED 20-9358 TO MESSENGER APPS DELETED 40-3314, ADDED INDIVIDUAL COMPONENTS REV'D GRND SCREW TO GRND STUD CN-1866	10/24/05 BMB
A	ADDED PART 47 CN-1851	07/11/05 BMB

MERCURY INSTRUMENTS, INC.

ASSEMBLY, CASE ERX 800 OPTIONAL BOARDS CONT'D, SINGLE BATTERY PACK

MATERIAL	SCALE 3/8:1	BY: BMB 02/18/05
		APP. BY : CN-1828
	DWG SIZE B	20-9965-B

Honeywell



INTERNAL RS-232 CONFIGURATION
(SEE NOTE 2)

EXTERNAL RS-232 CONFIGURATION
(SEE NOTE 2)

DUAL ALKALINE PACKS/ MI MODEM			
Item	Part Number	Description	Qty.
1	22-9934-1	DRILLING, CASE, DUAL PACKS/ MI MODEM	1
2	40-1865	ALKALINE RECEPTACLE PACK (SEE NOTE 1)	2
3	20-8735	ASSEMBLY, MODEM CARRIER MOUNTING	1
4	40-2115	MODEM, MI	1
5	60-1210	SCREW, 6-32 x 1/4 FILL. HD	5
6	60-4219	SCREW, 6-32 x 1/4 PN HD	4
7	20-8673	POST, CARRIER PLATE MOUNTING	1
8	60-1228	SCREW, 6-32 x 3/4 BD HD	1
9	40-2717-14	ASSEMBLY, PCB CABLE, SERIAL I/O	1
10	20-8087	LABEL, WARNING DCU	1
11	40-2212	JACK, TELEPHONE	1
12	60-4222	SCREW, 6-32 x 1-1/8 FLT HD	2
13	40-2342	GROUND WIRE, ECAT & ER MODEM	1
14	40-2769-3	POWER CABLE ASSY	1
15	40-2013	GROUND WIRE ASSY	1
16	40-2132-8	MODEM TELEPHONE CABLE ASSY	1
17	20-8314	CLIP, CABLE	1
18	20-8723	LABEL, MODEM STATUS	1
19	20-8731	LABEL, PART 68 CERTIFICATION	1

NOTES:
1. REMOVE WIRING CLIP FROM 40-1865 BEFORE MOUNTING INSIDE OF CASE.
2. SEE PAGE 8 FOR ALL RS-232 PARTS AND MOUNTING DETAILS.
3. VIEWS ARE SHOWN FOR WALL, U-BOLT, & PIPESTAND MOUNT, BUT ARE COMMON TO THE PORTABLE MOUNT.

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES.
DIMENSIONS WITH [ ] ARE IN mm.
FRACTIONAL TOL. ± .010
DECIMAL TOL. ± .005
ANGLE TOL. ± 1/2
REMOVE ALL BURRS.

B	ADDED MI MODEM AND PORTABLE MOUNTING CONFIGS ADDED 20-9358 TO MESSENGER APPS DELETED 40-3314, ADDED INDIVIDUAL COMPONENTS REV'D GRND SCREW TO GRND STUD — CN-1866	10/24/05 BMB
A	ADDED PART 47 — CN-1851	07/11/05 BMB

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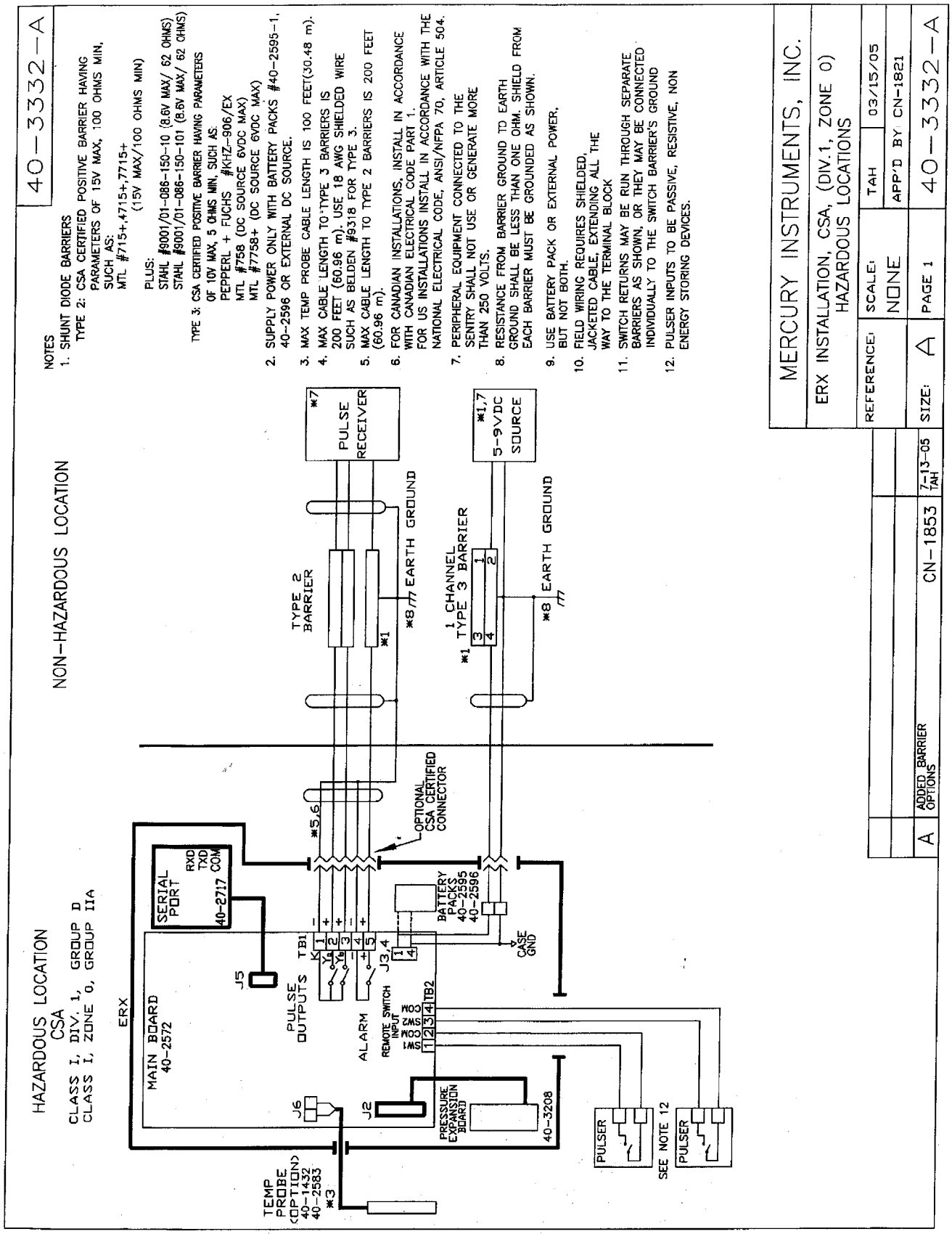
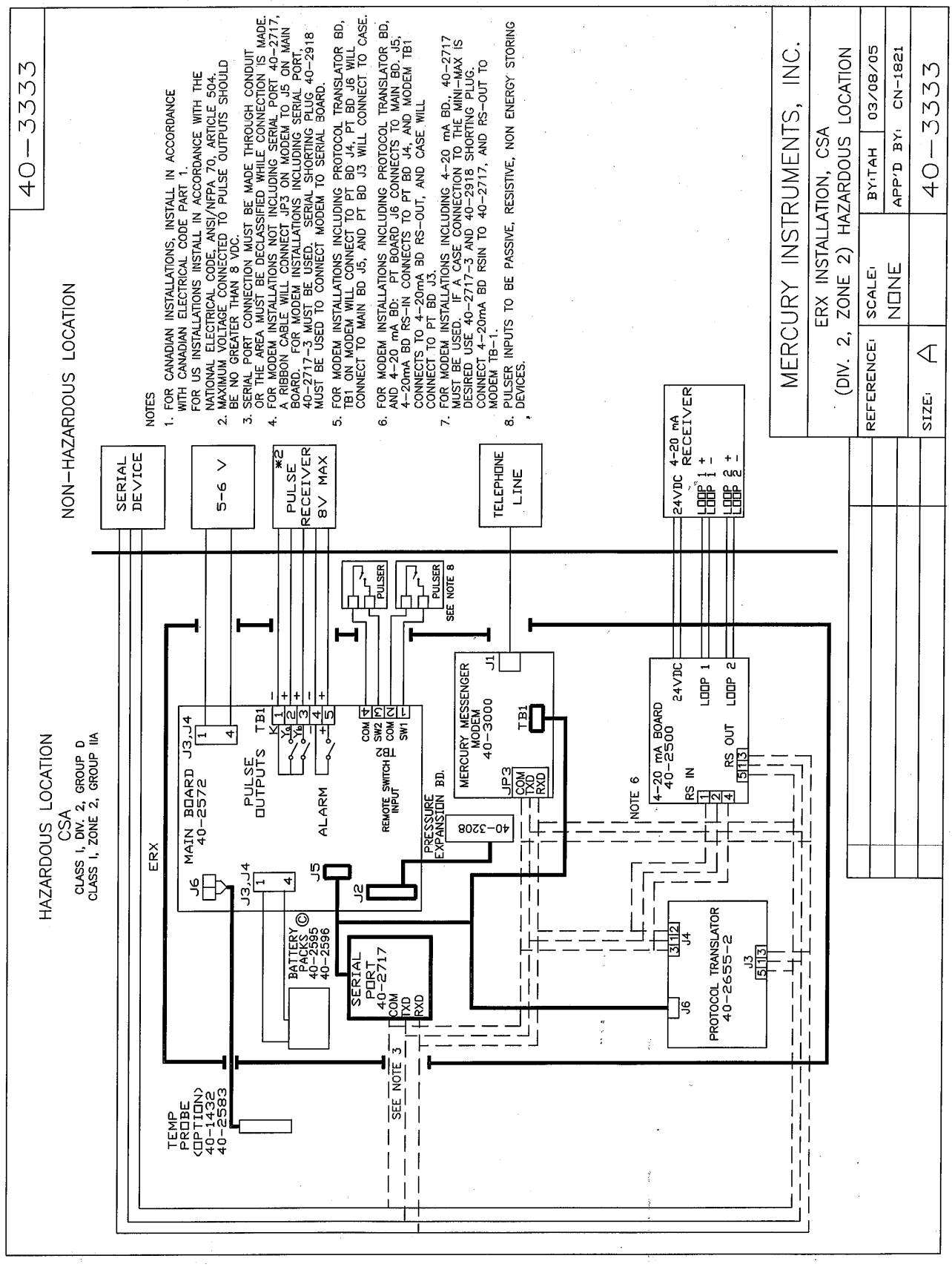
MERCURY INSTRUMENTS, INC.

ASSEMBLY, CASE, ERX 800, DUAL ALKALINE PACKS/ MI MODEM

MATERIAL	SCALE	BY: BMB	08/26/05
	3/8	APP. BY : CN-1828	
	DWG SIZE B	20-9965-B	


40-3332-A
NOTES
1. SHUNT DIODE BARRIERS
TYPE 2: CSA CERTIFIED POSITIVE BARRIER HAVING PARAMETERS OF 15V MAX, 100 OHMS MIN, SUCH AS:
MTL #715+,4715+,7715+ (15V MAX/100 OHMS MIN)
PLUS:
STAHL #9001/01-086-150-10 (8.6V MAX/ 62 OHMS)
STAHL #9001/01-086-150-101 (8.6V MAX/ 62 OHMS)
TYPE 3: CSA CERTIFIED POSITIVE BARRIER HAVING PARAMETERS OF 10V MAX, 5 OHMS MIN, SUCH AS:
PEPPERL + FUCHS #KHZ-906/EX
MTL #758 (DC SOURCE 6VDC MAX)
MTL #7758+ (DC SOURCE 6VDC MAX)
2. SUPPLY POWER ONLY WITH BATTERY PACKS #40-2595-1, 40-2596 OR EXTERNAL DC SOURCE.
3. MAX TEMP PROBE CABLE LENGTH IS 100 FEET(30.48 m).
4. MAX CABLE LENGTH TO TYPE 3 BARRIERS IS 200 FEET (60.96 m). USE 18 AWG SHIELDED WIRE SUCH AS BELDEN #9318 FOR TYPE 3.
5. MAX CABLE LENGTH TO TYPE 2 BARRIERS IS 200 FEET (60.96 m).
6. FOR CANADIAN INSTALLATIONS, INSTALL IN ACCORDANCE WITH CANADIAN ELECTRICAL CODE PART 1. FOR US INSTALLATIONS INSTALL IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE, ANSI/NFPA 70, ARTICLE 504.
7. PERIPHERAL EQUIPMENT CONNECTED TO THE SENTRY SHALL NOT USE OR GENERATE MORE THAN 250 VOLTS.
8. RESISTANCE FROM BARRIER GROUND TO EARTH GROUND SHALL BE LESS THAN ONE OHM. SHIELD FROM EACH BARRIER MUST BE GROUNDED AS SHOWN.
9. USE BATTERY PACK OR EXTERNAL POWER, BUT NOT BOTH.
10. FIELD WIRING REQUIRES SHIELDED, JACKETED CABLE, EXTENDING ALL THE WAY TO THE TERMINAL BLOCK
11. SWITCH RETURNS MAY BE RUN THROUGH SEPARATE BARRIERS AS SHOWN, OR THEY MAY BE CONNECTED INDIVIDUALLY TO THE SWITCH BARRIER'S GROUND
12. PULSER INPUTS TO BE PASSIVE, RESISTIVE, NON ENERGY STORING DEVICES.
NON-HAZARDOUS LOCATION
HAZARDOUS LOCATION
CSA
CLASS I, DIV. 1, GROUP D
CLASS I, ZONE 0, GROUP IIA
ERX
MAIN BOARD 40-2572
SERIAL PORT
RXD TXD COM
40-2717
J5
PULSE OUTPUTS TB1
ALARM
REMOTE SWITCH INPUT
SW1 SW2 COM
TB2
J3,4
BATTERY PACKS 40-2595 40-2596
CASE GND
J6
J2
PRESSURE EXPANSION BOARD
40-3208
TEMP PROBE (OPTION) 40-1432 40-2583 *3
PULSER
PULSER
SEE NOTE 12
*5,6
OPTIONAL CSA CERTIFIED CONNECTOR
TYPE 2 BARRIER
*1
*8 EARTH GROUND
*7
PULSE RECEIVER
1 CHANNEL TYPE 3 BARRIER
*1
*8 EARTH GROUND
*1,7
5-9VDC SOURCE
MERCURY INSTRUMENTS, INC.
ERX INSTALLATION, CSA, (DIV.1, ZONE 0) HAZARDOUS LOCATIONS
REFERENCE:
SCALE: NONE
TAH 03/15/05
APP'D BY CN-1821
SIZE: A
PAGE 1
40-3332-A
A ADDED BARRIER OPTIONS CN-1853 7-13-05 TAH


40-3333
NON-HAZARDOUS LOCATION
HAZARDOUS LOCATION
CSA
CLASS I, DIV. 2, GROUP D
CLASS I, ZONE 2, GROUP IIA
NOTES
1. FOR CANADIAN INSTALLATIONS, INSTALL IN ACCORDANCE WITH CANADIAN ELECTRICAL CODE PART 1. FOR US INSTALLATIONS INSTALL IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE, ANSI/NFPA 70, ARTICLE 504.
2. MAXIMUM VOLTAGE CONNECTED TO PULSE OUTPUTS SHOULD BE NO GREATER THAN 8 VDC.
3. SERIAL PORT CONNECTION MUST BE MADE THROUGH CONDUIT OR THE AREA MUST BE DECLASSIFIED WHILE CONNECTION IS MADE.
4. FOR MODEM INSTALLATIONS NOT INCLUDING SERIAL PORT 40-2717, A RIBBON CABLE WILL CONNECT JP3 ON MODEM TO J5 ON MAIN BOARD. FOR MODEM INSTALLATIONS INCLUDING SERIAL PORT, 40-2717-3 MUST BE USED. SERIAL SHORTING PLUG 40-2918 MUST BE USED TO CONNECT MODEM TO SERIAL BOARD.
5. FOR MODEM INSTALLATIONS INCLUDING PROTOCOL TRANSLATOR BD, TB1 ON MODEM WILL CONNECT TO PT BD J4, PT BD J6 WILL CONNECT TO MAIN BD J5, AND PT BD J3 WILL CONNECT TO CASE.
6. FOR MODEM INSTALLATIONS INCLUDING PROTOCOL TRANSLATOR BD, AND 4-20 mA BD: PT BOARD J6 CONNECTS TO MAIN BD. J5, 4-20mA BD RS-IN CONNECTS TO PT BD J4, AND MODEM TB1 CONNECTS TO 4-20mA BD RS-OUT, AND CASE WILL CONNECT TO PT BD J3.
7. FOR MODEM INSTALLATIONS INCLUDING 4-20 mA BD., 40-2717 MUST BE USED. IF A CASE CONNECTION TO THE MINI-MAX IS DESIRED USE 40-2717-3 AND 40-2918 SHORTING PLUG. CONNECT 4-20mA BD RSIN TO 40-2717, AND RS-OUT TO MODEM TB-1.
8. PULSER INPUTS TO BE PASSIVE, RESISTIVE, NON ENERGY STORING DEVICES.
SERIAL DEVICE
5-6 V
PULSE RECEIVER 8V MAX
*2
TELEPHONE LINE
24VDC 4-20 mA RECEIVER
LOOP 1 +
LOOP 1 -
LOOP 2 +
LOOP 2 -
ERX
MAIN BOARD 40-2572
J3,J4
J6
J5
J2
PULSE OUTPUTS
TB1
ALARM
REMOTE SWITCH INPUT
PULSER
SEE NOTE 8
PRESSURE EXPANSION BD.
40-3208
MERCURY MESSENGER MODEM 40-3000
J1
TB1
JP3
COM
TXD
RXD
4-20 mA BOARD 40-2500
RS IN
24VDC
LOOP 1
LOOP 2
RS OUT
NOTE 6
BATTERY PACK 40-2595 40-2596
SERIAL PORT 40-2717
PROTOCOL TRANSLATOR 40-2655-2
J4
J6
J3
TEMP PROBE (OPTION) 40-1432 40-2583
SEE NOTE 3
MERCURY INSTRUMENTS, INC.
ERX INSTALLATION, CSA
(DIV. 2, ZONE 2) HAZARDOUS LOCATION
REFERENCE:
SCALE:
NONE
BY:TAH
03/08/05
APP'D BY: CN-1821
SIZE: A
40-3333

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